
CANCER INCIDENCE AND MORTALITY IN MASSACHUSETTS 1999-2003: STATEWIDE REPORT

Center for Health Information, Statistics,
Research, and Evaluation

Massachusetts Department of Public Health

October 2006

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IN MASSACHUSETTS
1999-2003:
STATEWIDE REPORT

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Center for Health Information, Statistics, Research, and Evaluation

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ACKNOWLEDGMENTS

This report was prepared by Susan T. Gershman, Director, Massachusetts Cancer Registry, and Massachusetts Cancer Registry staff and consultants. Special thanks are given to Bertina Backus and Annie MacMillan for their diligent work in the preparing the data for this report. Thanks are also given to consultants Laurie MacDougall and Melissa Liu and the staff of the Massachusetts Cancer Registry for their editing and data processing efforts, and also to Pat Drew for editing the discussion in the prostate cancer section. Thanks are given to Malena Hood in the Division of Research and Epidemiology and staff in the Registry of Vital Records and Statistics for providing the mortality data.

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We acknowledge the Centers for Disease Control and Prevention for its support of the staff and the printing and distribution of this report under cooperative agreement U55/CCU121937-04 awarded to the Massachusetts Department of Public Health. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention.

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Cancer Incidence and Mortality in Massachusetts, 1999-2003: Statewide Report presents cancer incidence and mortality data for the Commonwealth from 1999 through 2003. The data include numbers and rates for twenty-four types of cancer, detailed information about the most commonly occurring types of cancer, information about age-specific patterns, a discussion of cancer trends, an examination of patterns by race/ethnicity, and a comparison of Massachusetts and national cancer rates. The report provides data only on invasive cancer, except for urinary bladder (which includes *in situ* and invasive cancers combined) and *in situ* breast cancer. This year, the special section focuses on prostate cancer and includes a twenty-two year trend of incidence and mortality and age conditional probabilities of developing and dying from prostate cancer.

Highlights from the report

- From 1999 to 2003 there were 173,430 newly diagnosed cases of cancer and 69,026 deaths from cancer among Massachusetts residents. The average annual age-adjusted incidence rate was 524.3 per 100,000 persons, and the average annual age-adjusted mortality rate was 203.8 per 100,000 persons. Overall, cancer incidence and mortality rates in Massachusetts were stable over the years 1999-2003.
- Prostate cancer was the most common type of newly diagnosed cancer among Massachusetts males. Prostate cancer accounted for 30% of new cancers among males in the state from 1999 to 2003. The average annual age-adjusted incidence rate of prostate cancer was 185.1 per 100,000 males. The annual incidence rate of prostate cancer fluctuated over the years without any statistically significant trend from 1999 to 2003. The mortality rate of prostate cancer decreased significantly by 2.9% per year from 1999 to 2003.
- From 1999 to 2003, invasive breast cancer was the most common type of newly diagnosed cancer among Massachusetts females, accounting for approximately 30% of new cancers among females in the state. The average annual age-adjusted incidence rate of breast cancer was 141.3 per 100,000 females. The incidence rate of female invasive breast cancer decreased significantly over the years 1999-2003 by 2.0% annually. The mortality rate from breast cancer also decreased during this period by 1.5% annually, though not significantly. The age-adjusted incidence rate of *in situ* breast cancer for Massachusetts females was 49.0 per 100,000.
- Cancer of the bronchus and lung was the most common cause of cancer deaths among both Massachusetts males and females between 1999 and 2003, accounting for 29% of all deaths among males and about 25% of all deaths among females. During this time period, the mortality rate of cancer of the bronchus and lung in Massachusetts decreased by 1.2% annually for males and increased by 2.7% annually for females. These changes were not statistically significant for males, but were statistically significant for females. The incidence rate of cancer of the bronchus and lung increased significantly by 1.0% per year for Massachusetts females during 1999-2003.
- For all types of cancer combined for 1999-2003, black, non-Hispanics had the highest age-adjusted incidence and mortality rate among Massachusetts males.
- Between 1999 and 2003, for all Massachusetts male race/ethnicity groups, cancers of the prostate, bronchus and lung, and colon/rectum were the top three most commonly diagnosed cancers, and cancer of the bronchus and lung was the most common cause of cancer death.
- For all types of cancer combined for 1999-2003, white, non-Hispanics had the highest age-adjusted incidence rate and black, non-Hispanics had the highest age-adjusted mortality rate among Massachusetts females.

- Breast cancer was the most commonly diagnosed cancer for all Massachusetts female race/ethnicity groups from 1999 to 2003. Cancers of the bronchus and lung and colon/rectum were among the next two leading cancers among females. Bronchus and lung was second and colon/rectum was third for white, non-Hispanic and black, non-Hispanic females. For Asian, non-Hispanic and Hispanic females, colon/rectum was second and bronchus and lung was third. Cancer of the bronchus and lung was the most common cause of cancer death among all female race/ethnicities in Massachusetts, except Hispanic females. Breast cancer was the most common cause of death among Hispanic females.
- The age-adjusted incidence rates in Massachusetts were generally higher than their national counterparts. The Massachusetts male and female incidence rates for all sites combined from 1999-2003 were 623.1 per 100,000 and 460.6 per 100,000, while the 1998-2002 rates for the North American Association of Central Cancer Registries (NAACCR) were 561.4 per 100,000 and 418.2 per 100,000, respectively.
- Similarly, the age-adjusted mortality rates in Massachusetts males and females were generally slightly higher than the age-adjusted mortality rates in the United States. For all cancers sites combined the mortality rates were 256.0 per 100,000 versus 247.5 per 100,000 for males and 172.8 per 100,000 versus 165.5 per 100,000 for females.
- Prostate cancer incidence rates have been wavering over the past decade, while the mortality rates have decreased. Over the last five years, the probability of developing prostate cancer over a lifespan (0-85 years) was 16.8%, but the probability of dying from prostate cancer was only 2.0%.

INTRODUCTION

INTRODUCTION

The Massachusetts Cancer Registry (MCR) collects reports of newly diagnosed cases of cancer and routinely compiles summaries of cancer incidence and mortality data. This report, *Cancer Incidence and Mortality in Massachusetts, 1999-2003: Statewide Report*, is produced annually with statewide data. Another report, *Cancer Incidence in Massachusetts: City and Town Supplement*, is also produced annually and contains information for the 351 cities and towns in Massachusetts. Electronic versions of these reports may be found on the Internet at <http://www.mass.gov/dph/mcr>.

Content

This report:

- provides statewide information on cancer incidence and mortality in Massachusetts for twenty-four types of cancer and for all cancers combined for 1999 through 2003;*
- provides detailed information about the most commonly occurring types of cancer for 1999 through 2003;
- examines cancer incidence patterns by age;
- reviews Massachusetts cancer incidence and mortality trends for 1999 through 2003;
- examines cancer patterns by race/ethnicity;
- compares Massachusetts incidence and mortality data with national incidence and mortality data; and
- provides detailed information about prostate cancer in Massachusetts;

The rest of the report is organized into the following sections:

- **METHODS** provides a detailed explanation of the data collection, data processing and statistical techniques employed in this report

and the limitations to consider when reviewing the data.

- **OVERVIEW** provides an overview of the incidence and mortality data in Massachusetts from 1999 through 2003, including leading types of cancer, cancer incidence by age, cancer trends, cancer patterns by race/ethnicity, and a comparison of rates in Massachusetts as compared to the U.S.
- **FIGURES & TABLES** presents cancer incidence and mortality data for twenty-four types of cancer for 1999-2003. There are six figures and twenty-four tables in this section with breakdowns such as sex, race/ethnicity, year, age group, state data versus national data, and cancer type.
- **SPECIAL SECTION: PROSTATE CANCER** provides detailed information about the incidence of and mortality from prostate cancer.
- **APPENDICES** provide information supplemental to this report, including a listing of codes used to prepare the report and population estimates.

** The Massachusetts incidence data in this report include only invasive cancers for twenty-two of the twenty-four types of cancer. Cancer of the urinary bladder includes both in situ and invasive cases. Cancer of the breast in situ is presented as a separate category, but is not included in the "all sites combined" data.*

New in This Report

- The text in the overview section has been reorganized to more consistently and concisely present the data. As a result, the ordering and numbering of some of the tables and figures have changed from the previous report.

- This year, the highlighted special section focuses on prostate cancer. This section has added maps of prostate cancer incidence rates by stage at diagnosis for six Massachusetts regions.

METHODS

METHODS

Data Sources

Cancer Incidence

The MCR collects reports of newly diagnosed cancer cases. In the year 2003, 70 Massachusetts acute care hospitals, three medical practice associations, five laboratories, one radiation/oncology facility, dermatologists and urologists reported to the MCR. Reports from dermatologists' offices and dermatopathology laboratories, particularly on cases of melanoma, have only been collected by the MCR since 2001. Reports from urologists' offices have only been collected by the MCR since 2002. Currently, the MCR collects information on *in situ* and invasive cancers and benign tumors of the brain and associated tissues. The MCR does not collect information on basal and squamous cell carcinomas of the skin.

The MCR also collects information from reporting hospitals on cases diagnosed and treated in staff physician offices when this information is available. Not all hospitals report this type of case, however, and some hospitals report such cases as if the patients had been diagnosed and treated by the hospital directly. Collecting this type of data makes the MCR's overall case ascertainment more complete. The cancer types most often reported to the MCR in this manner are prostate cancer and melanoma.

In addition, the MCR identifies previously unreported cancer cases through review of death certificate data to further improve case completeness. This process is referred to as death clearance and identifies cancers mentioned on death certificates that were not previously reported to the MCR. In some instances, the MCR obtains additional information on these cases through follow-up activities with hospitals, nursing homes and physicians' offices. In other instances, a cancer-related cause of death recorded on a Massachusetts death certificate is the only source of information for a cancer case. These "death certificate only" cancer diagnoses are, therefore, poorly documented, and have not been confirmed by review of complete clinical

information. Such cases are included in this report, but they comprise less than 3% of all cancer cases.

Case reports from 1999 to 2000 were coded following the International Classification of Diseases for Oncology, Second Edition (ICD-O-2) system (1). The International Classification of Diseases for Oncology, Third Edition (ICD-O-3) was implemented in North America with cases diagnosed as of January 1, 2001 (2). For comparability of the data, all cancer cases diagnosed prior to January 1, 2001, coded in ICD-O-2, were converted to ICD-O-3 following the Surveillance, Epidemiology, and End Results Program (SEER) rules of conversion (3).

Each year, the North American Association of Central Cancer Registries (NAACCR) reviews cancer registry data for quality, completeness, and timeliness. The NAACCR certification results for the MCR for diagnosis years 1999-2002 are presented in Table A. For 1999-2002, the MCR's annual case count was estimated by NAACCR to be more than 95% complete each year. The MCR achieved the gold standard for this certification element as well as in six other certification elements for each year from 1999-2002. Certification results for the year 2003 have not yet been released.

The Massachusetts cancer cases presented in this report are primary cases of cancer diagnosed among Massachusetts residents during 1999-2003 and reported to the MCR as of October 17, 2005. These data include some additional cases diagnosed in 1999-2002 that were not counted in the previous report because they were reported to the MCR too late to be incorporated in that report. Cancer site/types were grouped according to coding definitions adapted from the National Cancer Institute (NCI)'s SEER program (Appendix I). The Massachusetts data presented are invasive cancers, with the exception of urinary bladder and breast cancer. Both *in situ* and invasive cancers are presented for these sites. Invasive cancers have spread beyond the layer of cells where they started and have the potential to spread to other parts of the body. *In situ* cancers are neoplasms diagnosed at the earliest stage, before they have spread, when they are limited to

a small number of cells and have not invaded the organ itself. Typically, published incidence rates do not combine invasive and *in situ* cancers due to differences in the biologic significance, survival prognosis and types of treatment of the tumors. The breast *in situ* data are presented separately from the breast invasive data and are not added into the totals for all cancer sites combined. Due to the specific nature of the diagnostic technique and treatment patterns, *in situ* and invasive cancer of the urinary bladder are combined and *in situ* urinary bladder is added into the totals for all cancer sites combined.

The national incidence data are from NAACCR. The NAACCR incidence rates include data from 36 states, 5 metropolitan areas, and the District Columbia and cover about 77% of the United States population including Massachusetts (4). At the time of publication, 2002 was the latest diagnosis year from NAACCR available for public use. As a result, the NAACCR incidence rates cover the time period 1998-2002.

Cancer Mortality

The Massachusetts death data were obtained from the Massachusetts Registry of Vital Records and Statistics, which has legal responsibility for collecting reports of deaths in this state. Death reports from 1999 to 2003 were coded using the International Classification of Diseases, Tenth Revision (ICD-10) (5). The cancer site/type groups for deaths in this report were based on cancer site/type grouping from the SEER program (Appendix I). The cancer mortality data published in this report may differ slightly from the cancer mortality data published in *Massachusetts Deaths*, the annual Massachusetts Department of Public Health mortality surveillance publication. *Massachusetts Deaths* uses cancer site/type groupings from the National Center for Health Statistics.

The U.S. mortality data presented here are from NAACCR which uses data from the National Center for Health Statistics (6). The NAACCR mortality rates cover the entire U.S. population. At the time of publication, 2002 was the latest year for which mortality data were available from

NAACCR. As a result, the U.S. mortality rates cover the time period 1998-2002.

Definitions

Maps

Maps in this report were generated using a computerized geographic information system (GIS). Arcmap version 9.1, distributed by Environmental Systems Research Institute (ESRI), was the GIS software Massachusetts Cancer Registry (MCR) staff utilized to display these cartographic data. The cartographic data depicted is collected, maintained and distributed by the Executive Office of Environmental Affairs (EOEA), MassGIS. Maps generated by the MCR meet graphic standards set forth by the Massachusetts Department of Public Health for map data depiction.

Population Estimates

All of the population data were obtained from the Massachusetts Department of Public Health (MDPH) using the Massachusetts Community Health Information Profile (MassCHIP) demographic/census files. The 1999 data are based on a linear interpolation between the 1998 Massachusetts Institute for Social and Economic Research population estimate and the MDPH 2000 population estimate. The 2000-2003 data are based on the Massachusetts Census file abstracted from the *Census 2000 Summary File 1 (SF1)* file. Census data were reallocated to create mutually exclusive race categories consistent with the race categories used to collect cancer incidence and cancer mortality data. The population data used in this report are presented in Appendix II.

Race/Ethnicity

The MCR uses an algorithm developed by NAACCR called the NAACCR Hispanic Identification Algorithm (NHIA) to help classify Hispanic ethnicity. The algorithm is only applied to cases with an unknown Spanish/Hispanic origin or cases that have been classified as Hispanic based on a Spanish surname only. The algorithm

uses last name, maiden name, birthplace, race, and sex to determine the ethnicity of these cases.

The race/ethnicity categories presented in this report are mutually exclusive. Cases and deaths are only included in one race/ethnicity category. The race/ethnicity tables include the categories white, non-Hispanic; black, non-Hispanic; Asian, non-Hispanic; and Hispanic. The total population in Massachusetts also includes unknown races/ethnicities and American Indians. As a result, the number of cases for the total population is not the sum of cases by race/ethnicity.

Statistical Terms

- *Age-Specific Rates* – age-specific rates were calculated by dividing the number of people in an age group who were diagnosed with cancer or died of cancer in a given time frame by the number of people in that same age group overall in that time frame. They are presented as rates per 100,000 residents and are site- and sex- specific.
- *Age-Adjusted Rates* – an age-adjusted incidence or mortality rate is a weighted average of the age-specific rates, where the weights are the proportions of persons in the corresponding age groups of a standard 100,000 population. The potential confounding effect of age is reduced when comparing age-adjusted rates for different age-structured populations. The 2000 U.S. Bureau of the Census population distribution was used as a standard. Rates were age-adjusted using 18 five-year age groups. Age-adjusted rates can only be compared if they are adjusted to the same standard population. It is also important to note that differences in methodologies used in calculating rates, such as number of age groups used, may cause slight variations in results.
- *Confidence Intervals or Confidence Limits (CL)* - the confidence interval is a range of values determined by the degree of variability of the data within which the true value should lie. The 95% confidence intervals presented in this report mean that 95 times out of 100 this range of values will contain the true one. The confidence interval indicates the precision of the rate calculation; the wider the interval the less certain the rate. Statistically, the width of the interval reflects the size of the population and the number of events; smaller populations and smaller number of cases yield less precise estimates that have wider confidence intervals. Confidence intervals were used in the report as a conservative statistical test to estimate the difference between the age - adjusted incidence or mortality rates with the probability of error of 5% or less ($p \leq 0.05$). Rates and confidence intervals were not calculated when there were fewer than twenty cases. As shown by the New York State Department of Health, when the number of cases is below twenty, the statistical error of the rate calculation increases dramatically and becomes comparable to the rate value (7).
- *Estimated Annual Percent Change (EAPC)* – the EAPC is a statistical method for trend analysis. It shows how fast or slow a cancer rate has increased or decreased over the observed period of time. This estimation assumes that the change in incidence or mortality rates is constant during the observed time period. The EAPC for a short time period (1999-2003 for this report) was calculated using the SEER methods. The $EAPC = 100 * (e^m - 1)$, where m is a slope of the linear regression line which is an approximation of the function of the natural logarithm of the rates by the year of diagnosis (8). A positive EAPC corresponds to an increasing trend, while a negative EAPC corresponds to a decreasing trend. All of the EAPCs calculated in this report were statistically tested ($p \leq 0.05$) against the hypothesis that they are equal to zero (the rate is neither increasing nor decreasing).
- *Joinpoint Regression Analysis of Cancer Trends* - the EAPC is a linear approximation; therefore it may not give an accurate picture of long-term trends. SEER provides software to calculate the number and location (in time) of points where trends change direction (joinpoints). At each joinpoint, the trend may change in different ways. The joinpoint

regression model describes the trend as a sequence of linear segments between corresponding joinpoints, so that each segment has an associated EAPC positive trend, negative trend or no trend (9).

- *Median Age at Diagnosis* – represents the point (in age) where half of cancer cases occurred below this age and half of cases occurred above this age.
- *Probability of Being Diagnosed With or Dying From Cancer* – these probabilities were calculated using the DevCan Software developed by SEER (10). The results are presented as tables showing the probability (in percentage) of a person at a specified 5-year age group and sex being diagnosed with cancer within the next 10, 20, 30 years or within their remaining lifetime. The lifetime was restricted to the age 85 in this analysis.

Interpreting the Data

When interpreting cancer incidence and mortality data in this report, it is important to consider the following:

Border Areas and Neighboring States

Some areas of Massachusetts appear to have low cancer incidence, but this may be due to loss of cases in Massachusetts residents who were diagnosed in neighboring states and not reported to the MCR. Presently the MCR has reciprocal reporting agreements with the following fifteen states: Alaska, Arkansas, Connecticut, Florida, Maine, Mississippi, New Hampshire, New York, North Carolina, Rhode Island, South Carolina, Texas, Vermont, Wisconsin and Wyoming.

Cases Diagnosed in Non-Hospital Settings

During the time period covered by this report, the MCR's information sources for most newly diagnosed cases of cancer were hospitals. In addition, the MCR collected information from

reporting hospitals on cases diagnosed and treated in staff physician offices, when this information was available. In 2001, dermatologists and dermatopathology laboratories were added as reporting sources. The addition of these new reporting sources may elevate the incidence of melanoma diagnosed in the year 2001-2003. In 2002, urologist offices and a general laboratory were added as reporting sources. Some types of cancer in this report, such as prostate cancer, may be under-reported because they are diagnosed primarily by private physicians, private laboratories, health maintenance organizations or radiotherapy centers that escape the case identification systems used by hospitals. The extent of this under-reporting has not been determined exactly, but cases included in this report represent the great majority of cases statewide and provide an essential basis for evaluating statewide cancer incidence patterns.

Definition of Cancer Sites

Note: including in situ cases in urinary bladder cancer incidence has elevated both the number of cases and rates for this site and for all sites combined compared to reports prior to 1997-2001.

The implementation of ICD-O-3 coding in 2001, and corresponding cancer site recodes, has changed the incidence of some types of tumors, especially ovarian cancer, leukemias, and lymphomas. These changes may affect annual site-specific incidence, causing a drop or spike in 2001-2003 rates, as well as the incidence of all sites combined and average annual incidence rates. Therefore, caution should be exercised when comparing rates in 2001-2003 with those for previous years, as well as when comparing this report with ones prior to 1997-2001.

Trends

Trend data should be interpreted with caution. Apparent increases or decreases in cancer incidence over time may reflect changes in diagnostic methods or case reporting rather than

true changes in cancer occurrence. Also, cancer incidence trends may appear more favorable than they actually are because they have not been adjusted for reporting error or delay (11). Typically, statewide Massachusetts cancer incidence data are released about two years after a diagnosis year; for example, data for 2003 diagnoses are released for the first time in 2006. The MCR continues to receive case reports on an ongoing basis even after the data are released. The delayed case reports, as well as corrections to cases based on subsequent details from the reporting facilities, result in reporting delay and error; the more recent diagnosis years may be less complete than the earlier diagnosis years. Finally, the following should be considered when interpreting trend data:

- The EAPC assumes that the change in rate is the same over the entire time period examined, which may or may not be true for the trends examined in this report.
- If the percent difference in rates between year 2003 and year 1999 is small, the statistical

significance of the EAPC may have no practical importance.

Race/Ethnicity

Race/ethnicity data for cancer cases are based on information in the medical record. Race/ethnicity data for cancer deaths are based on information from death certificates as reported by next-of-kin and funeral directors. Errors in these source documents may lead to incorrect classification of race/ethnicity. Also, completeness of the race/ethnicity data may be different for cancer cases and cancer deaths. Some race/ethnicity categories may be under-reported if race/ethnicity is not available for all cases. Counts and rates may under-represent the true incidence of cancer in some racial/ethnic populations. The NAACCR Hispanic Identification Algorithm (NHIA) has been implemented in this report to help classify Hispanic ethnicity.

Table A.
North American Association of Central Cancer Registries (NAACCR) Certification Results
for the Massachusetts Cancer Registry (MCR)

| Registry Element | Gold Standard | Silver Standard | MCR Results By Year | | | | Standard Achieved |
|-------------------------------------|--|-----------------|---------------------|-------|-------|-------|-------------------|
| | | | 1999 | 2000 | 2001 | 2002 | |
| Completeness of case ascertainment* | 95% | 90% | >95% | >95% | >95% | >95% | Gold |
| Unknown "age at diagnosis" | ≤2% | ≤3% | 0.0% | 0.0% | 0.0% | 0.0% | Gold |
| Unknown "sex" | ≤2% | ≤3% | 0.0% | 0.0% | 0.0% | 0.0% | Gold |
| Unknown "race" | ≤3% | ≤5% | 2.0% | 2.7% | 1.9% | 1.3% | Gold |
| Death certificate only cases† | ≤3% | ≤5% | 2.5% | 1.9% | 1.7% | 1.5% | Gold |
| Duplicate primary cases | ≤0.1% | ≤0.2% | 0.08% | 0.03% | 0.04% | 0.04% | Gold |
| Timeliness | Data submitted within 24 months of close of calendar year. | | | | | | Gold |

* Completeness of case ascertainment was estimated by methods from the NAACCR.

† Death certificate only cases are cases that are identified through the death certificate clearance process and only have information from a death certificate.

OVERVIEW

OVERVIEW

In Massachusetts, from 1999 through 2003, there were 173,430¹ newly diagnosed cases of cancer – 87,573 in males and 85,808 in females. For all types of cancer combined for 1999-2003, the average annual age-adjusted incidence rate among males was 623.1 cases per 100,000. For all types of cancer combined for 1999-2003, the average annual age-adjusted incidence rate among females was 460.6 cases per 100,000.

Leading Types of Cancer

Incidence

Males

The most commonly diagnosed type of cancer in Massachusetts males from 1999-2003 was prostate cancer, followed by cancers of the bronchus and lung, colon/rectum and urinary bladder. These four cancer types comprised about 63% of newly diagnosed cases. Prostate cancer comprised 30% of all male incident cases (Figure 1).

From 1999-2003, the age-adjusted incidence rates for these four leading types of cancer were 185.1 cases per 100,000 for prostate cancer, 89.1 cases per 100,000 for cancer of the bronchus and lung, 72.2 cases per 100,000 for colon/rectum cancer, and 48.0 cases per 100,000 for urinary bladder cancer. Other leading cancer types for males included melanoma, non-Hodgkin lymphoma, cancer of the kidney and renal pelvis, cancer of the oral cavity and pharynx, leukemia, and pancreatic cancer (Figure 2).

Females

Among Massachusetts females, the most commonly diagnosed cancer types were cancers of the breast, bronchus and lung, colon/rectum,

and corpus uteri (uterus), representing about 61% of new cancer cases during 1999-2003. Breast cancer comprised 30% of all female incident cases (Figure 1).

From 1999-2003, the age-adjusted incidence rates for these four leading types of cancer were 141.3 cases per 100,000 for breast cancer, 62.0 cases per 100,000 for cancer of the bronchus and lung, 50.9 cases per 100,000 for colon/rectum cancer, and 28.7 cases per 100,000 for cancer of the uterus. Other leading cancer types for females included non-Hodgkin lymphoma, melanoma, ovarian cancer, thyroid cancer, urinary bladder cancer, and pancreatic cancer (Figure 2).

Mortality

Males

Cancer of the bronchus and lung was the leading cause of cancer death for Massachusetts males between 1999 and 2003. During this time period, cancer of the bronchus and lung accounted for 29% of all cancer deaths in males. Prostate cancer ranked second in mortality for males. The third and fourth most common causes of cancer death in Massachusetts males for 1999-2003 were cancers of the colon/rectum and pancreas. The four leading types of cancer comprised approximately 55% of all cancer deaths for this time period (Figure 3).

From 1999 to 2003, the age-adjusted mortality rates for these four leading causes of cancer death were 71.8 deaths per 100,000 for cancer of the bronchus and lung, 30.7 deaths per 100,000 for prostate cancer, 26.8 deaths per 100,000 for colon/rectum cancer, and 13.4 deaths per 100,000 for pancreatic cancer. Other leading causes of cancer death for males during this time period included cancer of the esophagus, non-Hodgkin lymphoma, leukemia, and cancers of the urinary bladder, liver and intrahepatic bile ducts, and stomach (Figure 4).

Females

Cancer of the bronchus and lung was also the leading cause of cancer death for Massachusetts

¹ The male and female case counts will not add up to the total case count because the MCR collects two additional gender classifications (transsexuals and persons with sex chromosome abnormalities/hermaphrodites).

females between 1999 and 2003. During this time period, this cancer accounted for 25% of all cancer deaths in females. Breast cancer ranked second in mortality for females. The third and fourth most common causes of cancer death in Massachusetts females for 1999-2003 were cancers of the colon/rectum and pancreas. The four leading types of cancer comprised approximately 57% of all cancer deaths for this time period (Figure 3).

From 1999 to 2003, the age-adjusted mortality rates for these four leading causes of cancer death were 44.5 deaths per 100,000 for cancer of the bronchus and lung, 26.7 deaths per 100,000 for breast cancer, 17.9 deaths per 100,000 for colon/rectum cancer, and 10.1 deaths per 100,000 for pancreatic cancer. Other leading causes of cancer death for females during this time period included cancer of the ovary, non-Hodgkin lymphoma, leukemia, and cancers of the uterus, brain and other nervous system, and stomach (Figure 4).

Cancer Incidence Patterns by Age

The likelihood of being diagnosed with cancer increased steadily with age for many cancers. The age-specific incidence rate for all sites combined for males rose from 20.8 per 100,000 in the age group 0-4 to 3,490.4 per 100,000 in the age group 80-84 (Table 1). For females, the age-specific rate for all sites combined increased from 22.8 for ages 0-4 to 2,161.5 for ages 80-84 (Table 2). The cancer incidence rate for people aged 85 and above declined for both males and females (Tables 1 and 2).

The median age of diagnosis with any type of cancer in the period 1999-2003 was 68 years for males and 67 years for females (Tables 1 and 2). For many of the cancer types presented in this report, the median age at diagnosis was age 60 or older. The following cancers were diagnosed at a younger median age (males and females combined for cancers occurring in both sexes): brain and other nervous system (median age – 57), breast *in situ* (median age – 56), cervix (median age – 50), Hodgkin lymphoma (median age – 38), testis

(median age – 35), and thyroid (median age – 46) (Tables 1-3).

Cancer Trends

Incidence

From 1999 to 2003, overall cancer incidence in Massachusetts remained almost unchanged. Though cancer rates fluctuated by year, the average annual percentage change in incidence rates did not exceed 0.7% for both males and females. Nationally, cancer incidence rates for all cancer sites combined were stable for males from 1995 to 2002, but have increased by 0.3% per year for females from 1987 to 2002 (12). Incidence trends in the leading cancers affecting Massachusetts males and females are discussed below. See Figures 5 and 6 for incidence trends and Tables 4, 5 and 6 for annual age-adjusted incidence rates over the years 1999-2003.

All the data describing percent increases and decreases per year are based upon the estimated annual percent change (EAPC). Additional new sources of data collection, such as dermatologists' offices and dermatopathology laboratories, the inclusion of *in situ* cases in incidence of urinary bladder, and the implementation of the ICD-O-3 coding system in 2001 may affect the EAPC for melanoma, urinary bladder, leukemias, lymphomas, ovarian cancer and all sites combined and may not reflect true change in incidence.

Males

Among Massachusetts males between 1999 and 2003, the incidence rate of prostate cancer decreased by 2.2% per year, though the decrease was not statistically significant (Figure 5). The 1999 incidence rate of prostate cancer was 185.9 cases per 100,000 males, and decreased to 168.7 cases per 100,000 males in 2003 (Table 4). In addition, there was an overall decrease in prostate cancer from its peak incidence of 217.4 per 100,000 in 1992. The national increase in prostate cancer incidence during the late 1980s and early 1990s is attributed to changes in diagnostic methodology and increased prostate-specific antigen (PSA) screening (13). A more detailed analysis of prostate cancer incidence is presented

in this report in the special section entitled "Prostate Cancer".

The age-adjusted incidence rate declined slightly by 0.8% per year (Figure 5) for cancer of the bronchus and lung, the second most commonly diagnosed cancer in males, though the decrease was not statistically significant. The incidence rate for cancer of the bronchus and lung fell from 91.0 cases per 100,000 males in 1999 to 85.9 cases per 100,000 in 2003 (Table 4). A decline is consistent with national data (12).

The incidence rate of colorectal cancer increased from 71.0 cases per 100,000 males in 1999 to 72.3 cases per 100,000 in 2003. The estimated annual percent increase was small (1.0%) and not statistically significant (Figure 5). The national data show that colorectal incidence rates decreased from 1998 to 2002 for males (12).

The incidence data for cancer of the urinary bladder include both *in situ* and invasive tumors. Incidence rates fluctuated over the years 1999-2003 with an average annual, non-statistically significant increase of 2.2% per year. In 1999, 45.3 males per 100,000 were diagnosed with cancer of the urinary bladder; by 2003, the incidence rate was 49.6 per 100,000 (Table 4).

Incidence rates of thyroid cancer increased significantly from 1999 to 2003 among males in Massachusetts (Figure 5).

Females

Invasive breast cancer incidence decreased significantly by 2.0% per year during the period 1999-2003 (Figure 6). The incidence rate decreased from 146.2 cases per 100,000 females in 1999 to 134.9 cases per 100,000 in 2003 (Table 5). Nationally, breast cancer incidence increased 0.4% per year from 1987-2002, which was a slower rate of increase than before 1987 (12). Rising breast cancer incidence during the 1990s has been attributed to increasing mammography screening (14).

The incidence of cancer of the bronchus and lung increased by 1.0% per year; the increase was small but statistically significant. The rate

changed from 60.6 cases per 100,000 females in 1999 to 62.7 cases per 100,000 in 2003 (Table 5). The national rate of cancer of the bronchus and lung among females stabilized from 1998 to 2002 after many years of increasing (12).

The rate of colorectal cancer, which is the third most common cancer among Massachusetts females, decreased by 1.1% per year over the years 1999 through 2003, though the decrease was not statistically significant. The Massachusetts incidence rate was 51.6 per 100,000 in 1999 and 48.3 per 100,000 in 2003.

The annual rate for uterine cancer, the fourth most common cancer among Massachusetts females, increased over the years 1999 to 2003, with a non-statistically significant increase of 2.5% per year (Figure 6).

In addition to the changes mentioned above, there were statistically significant trends from 1999 to 2003 for thyroid cancer (increase of 13.5% per year) and cancer of the urinary bladder (increase of 1.3% per year). The trend in urinary bladder cancer may be affected by the addition of new sources of information, namely urologists' offices.

Mortality

Cancer mortality for all sites combined from 1999 to 2003 varied little, decreasing annually by 1% per year for males and 0.3% per year for females (Figures 5 and 6). Recent national data show a decline in mortality rates for all cancer sites combined by 1.1% per year from 1993-2002 (12).

Males

Mortality from bronchus and lung, prostate, and colon/rectum cancers decreased for males over the years 1999-2003. These decreases were statistically significant for prostate cancer (2.9% per year) and colon/rectum cancer (3.0% per year) (Figure 5).

Females

For females, the bronchus and lung cancer mortality rate increased by 2.7% annually, while breast cancer mortality decreased by 1.5% per

year. The bronchus and lung cancer increase was statistically significant, but the breast cancer decrease was not. The colon/rectum cancer mortality rate declined for females by 2.2% per year. There was a significant decrease in the mortality rate of cancer of the cervix from 1999-2003 by 7.7% per year (Figure 6).

It is important to note that the mortality rates for most cancers with significant increases or decreases are low (Tables 7 and 8). A trend based on a small number of deaths may not be stable over a longer period. As a result, the statistical significance of EAPC for these sites may have no practical importance.

Cancer Patterns by Race/Ethnicity

Incidence

Table 10 presents the five leading cancers (based on age-adjusted rates) by race/ethnicity and sex. Tables 11, 12 and 13 present the distribution of cases by cancer type for all races combined and by race/ethnicity groups for males, females and for all sexes for the period 1999-2003. Age-adjusted rates for all races combined and by race/ethnicity, cancer type and sex are presented in the Tables 14, 15 and 16. The tables include age-adjusted rates surrounded by the 95% confidence intervals or limits (95% CL). See the Methods section of this report for more information about confidence intervals.

Overall, of the total 173,430 newly diagnosed cancer cases during 1999-2003, 158,335 new cancer cases occurred among white, non-Hispanics, 5,915 cases occurred in black, non-Hispanics, 2,140 in Asian, non-Hispanics and 3,901 new cases occurred in Hispanics (Table 13). The remaining 3,139 cases occurred in American Indians or those whose race/ethnicity was unknown.

Males

Among males, the top three most commonly diagnosed cancers were the same for each male race/ethnicity category. These top three cancers were prostate cancer, followed by cancers of the

bronchus and lung and colon/rectum. Cancer of the urinary bladder ranked fourth for all Massachusetts male race/ethnicity categories except Asian, non-Hispanics. The fourth most commonly diagnosed cancer for Asian, non-Hispanic males was cancer of the liver and intrahepatic bile ducts. Non-Hodgkin lymphoma was the fifth most frequent cancer in Asian, non-Hispanic and Hispanic males. Melanoma and stomach cancer were the fifth most commonly diagnosed cancers for white, non-Hispanic and black, non-Hispanic males, respectively (Table 10).

From 1999 to 2003, black, non-Hispanic males had the highest incidence rate of all cancer types combined (708.7 per 100,000). This rate was significantly higher than the rates for other race/ethnicity groups ($p \leq 0.05$). Asian, non-Hispanic males had the lowest incidence rate of all sites combined (350.7 per 100,000) ($p \leq 0.05$). Black, non-Hispanic males had the highest rate of prostate cancer (308.1 per 100,000), which was significantly higher than the prostate cancer rates for other race/ethnicity groups. Nationally, prostate cancer incidence was 62 percent higher in black men than in white men (14). Asian, non-Hispanic men had the highest rate of liver cancer. The rate was 30.1 per 100,000 versus 8.8 per 100,000 for all races combined ($p \leq 0.05$) (Table 14).

Females

Based on age-adjusted rates, breast cancer was the most commonly diagnosed cancer for each female race/ethnicity category. Cancer of the bronchus and lung was the second leading cancer for white, non-Hispanic and black, non-Hispanic females, but the third leading cancer for Asian, non-Hispanic and Hispanic females. Cancer of the colon/rectum was the third leading cancer for white, non-Hispanic and black, non-Hispanic females, but the second leading cancer for Asian, non-Hispanic and Hispanic females. Corpus uteri cancer was the fourth leading cancer site for all race/ethnicity groups, except Asian, non-Hispanic females. Thyroid cancer was the fourth most common cancer for Asian, non-Hispanic females. Non-Hodgkin lymphoma was the fifth most frequent cancer in black, non-Hispanic and

Hispanic females. Melanoma and cancer of the corpus uteri were the fifth most commonly diagnosed cancers for white, non-Hispanic and Asian, non-Hispanic females, respectively (Table 10).

During 1993-2003, white, non-Hispanic females had the highest incidence rate of all cancer types combined (462.2 per 100,000) among all race/ethnicity groups. This rate was significantly higher than the rates for the other race/ethnicity groups ($p \leq 0.05$). Asian, non-Hispanic females had the lowest incidence rate of all sites combined (281.5 per 100,000) ($p \leq 0.05$). The invasive breast and lung cancer incidence rates were statistically significantly higher for white, non-Hispanic females, 143.5 and 63.1 cases per 100,000, respectively, than the other race/ethnicity groups. The breast cancer *in situ* incidence rate was also statistically significantly higher among white, non-Hispanic females (Table 15).

Mortality

Table 17 presents the five leading causes of cancer mortality by race/ethnicity and sex. The number of cancer related deaths, age-adjusted mortality rates, and 95% confidence intervals by cancer type, race/ethnicity and sex are presented in Tables 18 through 23.

Of the 69,026 deaths from cancer between 1999 and 2003, 64,612 occurred among white, non-Hispanics, 2,642 among black, non-Hispanics, 758 among Asian, non-Hispanics and 955 among Hispanics (Table 20). Overall death rates were the highest in the black, non-Hispanic population, which is consistent with national data.

Males

For Massachusetts males, cancer of the bronchus and lung was the most common cause of cancer death among all male race/ethnicities based on age-adjusted rates. Cancer of the prostate was the second leading cause of cancer death among white, non-Hispanic, black, non-Hispanic, and Hispanic males. Cancer of the liver and intrahepatic bile ducts was the second leading cause of cancer death for Asian, non-Hispanic males. Cancer of the colon/rectum was the third

most common cause of cancer death among all male race/ethnicity groups (Table 17).

For all types of cancer combined for 1999-2003, black, non-Hispanics had the highest age-adjusted mortality rate among males, with 342.5 deaths per 100,000 males. Black, non-Hispanics had a statistically significant higher rate of lung cancer deaths (92.1 per 100,000 males) than all other race/ethnicity groups. Asian, non-Hispanic males had the highest rate of cancer of the liver and intrahepatic bile ducts, with a mortality rate of 20.1 per 100,000 (Table 21).

Females

Cancers of the bronchus and lung, breast, and colon/rectum were among the top three most common causes of cancer death for all Massachusetts female race/ethnicities. The ranking of those cancers differed between the race/ethnicity categories, however. Cancer of the bronchus and lung was the most common cause of cancer death for all female race/ethnicities in Massachusetts, except Hispanic females. Breast cancer was the most common cause of death for Hispanic females (Table 17).

For all types of cancer combined for 1999-2003, black, non-Hispanic females had the highest age-adjusted mortality rate among females with 201.4 deaths per 100,000 females. White, non-Hispanic females had the highest mortality rate of lung cancer, while black, non-Hispanic females had the highest mortality rate of breast cancer among all race/ethnicity groups. The death rate from colon/rectum cancer was statistically significantly higher in black, non-Hispanic females, 24.5 per 100,000 versus 17.9 per 100,000 for all races combined ($p \leq 0.05$) (Table 22).

Massachusetts Compared to the U.S.

Age-adjusted incidence and mortality rates in Massachusetts are compared to national rates in Table 24. The national incidence and mortality data are from the North American Association of Central Cancer Registries (NAACCR). It is important to interpret these data cautiously. Cancer rates may be affected by differences in the

racial/ethnic composition of the population, the difference in population estimates, the prevalence of cancer risk factors, and cancer screening rates. Cancer rates in Massachusetts and NAACCR areas or the United States may differ because of these variations. Also, the Massachusetts incidence and mortality data presented in these tables represent cancer cases and deaths from 1999-2003. The NAACCR incidence and the United States mortality data represent cancer cases and deaths from 1998-2002 (the latest available data from NAACCR).

Incidence

The NAACCR incidence data represents about 77% of the U.S. population, including 78% of whites, 69% of blacks, 87% of Asian/Pacific Islanders, and 76% of Hispanic/Latinos (4).

For all cancer sites combined and for both sexes, the age-adjusted incidence rates were higher in Massachusetts than the NAACCR areas. The incidence rates in Massachusetts were slightly higher than the incidence rates in the NAACCR areas for leading cancers: female bronchus and lung, male and female colon/rectum, female breast, prostate and uterine cancer. Female breast

in situ cancer incidence was higher in Massachusetts than in NAACCR registries (49.0 versus 28.5 per 100,000 females). The incidence rate of cervical cancer in Massachusetts was lower than the incidence rate in the NAACCR registries (6.6 per 100,000 versus 9.3 per 100,000) (Table 24).

Mortality

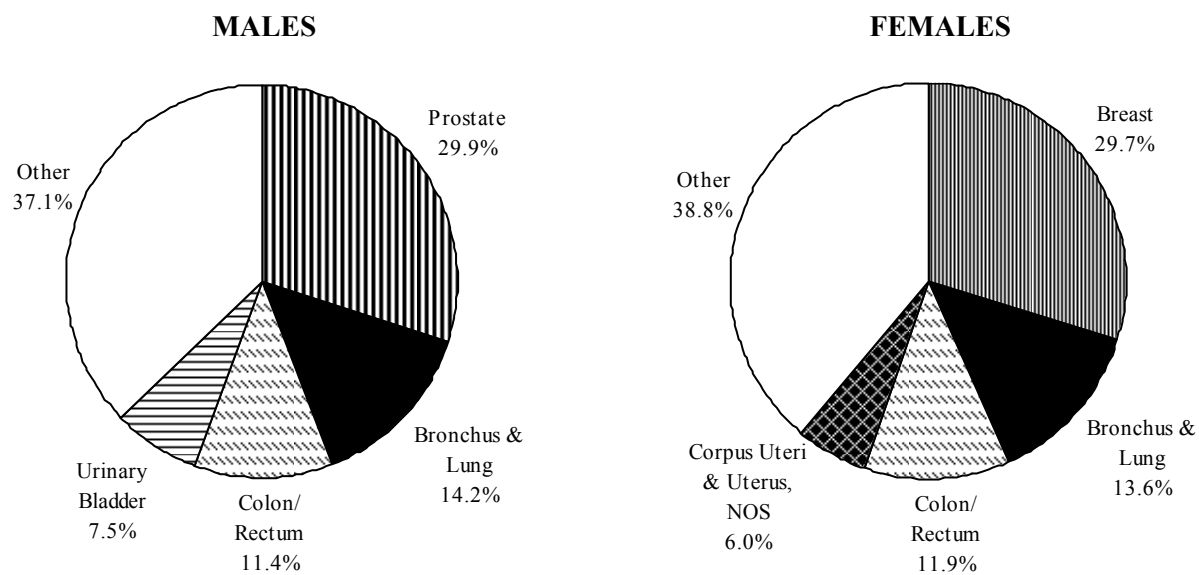
The national mortality data cover the entire United States population.

The age-adjusted mortality rate in Massachusetts was slightly higher than the age-adjusted mortality rate in the United States for all cancer sites combined, 256.0 per 100,000 versus 247.5 per 100,000 for males, and 172.8 per 100,000 versus 165.5 per 100,000 for females. Massachusetts had a higher mortality rate than the United States for cancers such as cancers of bronchus and lung, breast, and colon/rectum among females and colon/rectum and prostate cancers among males. Massachusetts mortality rates were lower than the U.S. for some other cancers such as bronchus and lung among males and cervix uteri among females (Table 24).

FIGURES & TABLES

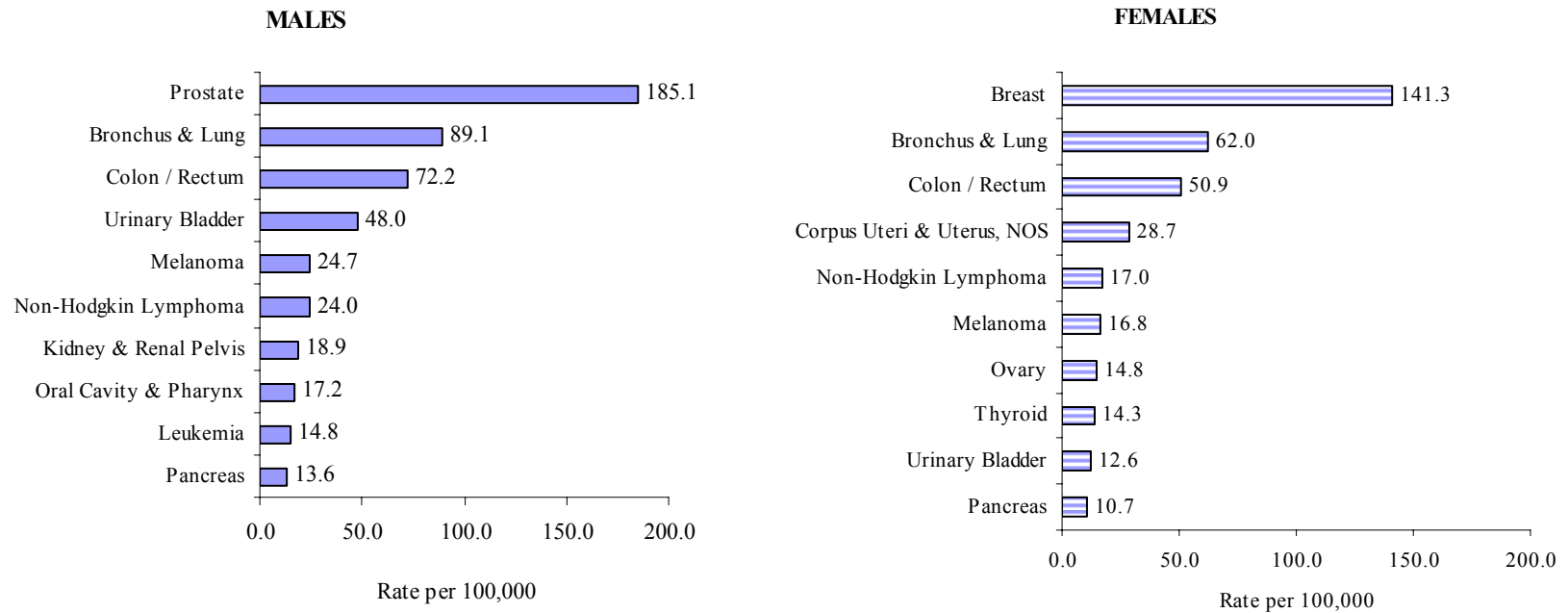
Figure 1.
CANCER INCIDENCE CASES BY CANCER TYPE AND SEX

Massachusetts, 1999-2003



NOS – Not Otherwise Specified

Figure 2.
INCIDENCE RATES¹ FOR TEN LEADING CANCER TYPES BY SEX
Massachusetts, 1999-2003



¹ Rates are age-adjusted to the 2000 U.S. Standard Population

Figure 3.
CANCER MORTALITY CASES BY CANCER TYPE AND SEX
Massachusetts, 1999-2003

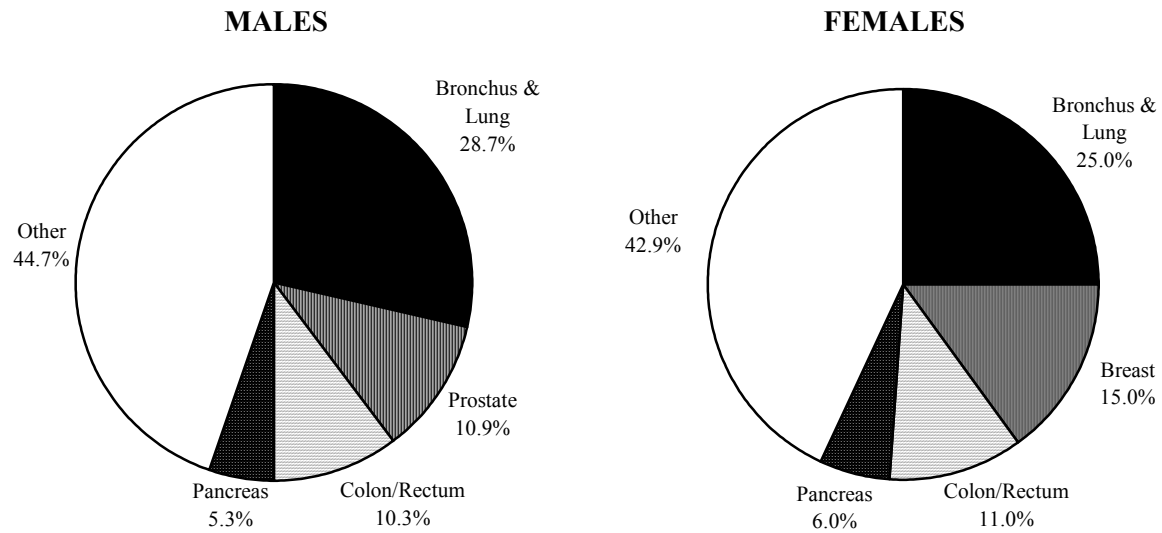
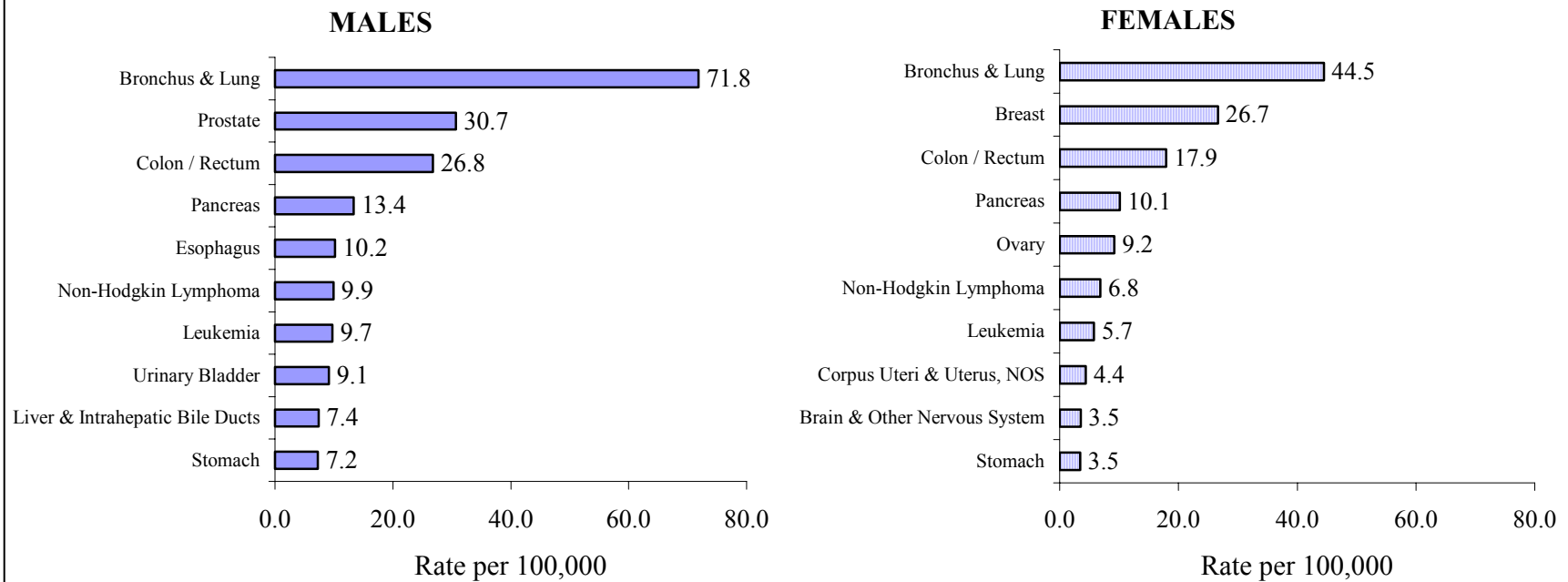


Figure 4.
MORTALITY RATES¹ FOR TEN LEADING CANCER TYPES BY SEX
Massachusetts, 1999-2003



¹ Rates are age-adjusted to the 2000 U.S. Standard Population

Table 1.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGES FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
MALES

| Cancer Site/Type | Age Groups | | | | | | | | | | | | | | | | | | Median |
|------------------------------------|----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85+ | Age |
| All Sites | 20.8 | 12.6 | 12.9 | 22.5 | 37.2 | 53.1 | 68.9 | 94.4 | 161.0 | 313.6 | 634.3 | 1198.9 | 1875.4 | 2527.3 | 3105.0 | 3435.4 | 3490.4 | 3420.2 | 68 |
| Brain & Other Nervous System | 3.5 | 4.3 | 3.5 | 2.8 | 2.4 | 3.7 | 3.5 | 4.7 | 5.7 | 8.6 | 9.8 | 18.5 | 18.9 | 21.2 | 25.1 | 28.6 | 33.0 | 28.3 | 56 |
| Breast | - ³ | - | - | - | - | - | 0.2 | 0.2 | 0.7 | 1.0 | 1.8 | 2.7 | 3.8 | 7.5 | 5.9 | 9.0 | 8.7 | 9.0 | 68 |
| Breast <i>In Situ</i> ² | - | - | - | 0.1 | - | - | - | - | 0.1 | 0.3 | 0.2 | 0.4 | 0.5 | 1.4 | 0.4 | 0.5 | 2.2 | - | 66 |
| Bronchus & Lung | - | - | - | 0.3 | 0.3 | 1.7 | 2.0 | 4.7 | 16.8 | 33.0 | 73.1 | 150.5 | 256.9 | 376.6 | 520.8 | 587.4 | 593.2 | 444.5 | 70 |
| Colon / Rectum | 0.1 | - | 0.2 | 0.2 | 0.8 | 1.8 | 4.7 | 7.1 | 15.9 | 32.5 | 67.4 | 120.9 | 180.4 | 256.3 | 350.8 | 443.7 | 543.2 | 562.4 | 71 |
| Esophagus | - | - | - | - | - | 0.1 | 0.4 | 0.9 | 2.6 | 6.8 | 13.3 | 25.5 | 37.3 | 48.8 | 55.2 | 61.5 | 64.7 | 65.1 | 68 |
| Hodgkin Lymphoma | 0.2 | 0.6 | 1.0 | 3.4 | 6.3 | 5.7 | 3.6 | 4.2 | 3.7 | 5.1 | 3.1 | 4.5 | 4.0 | 5.0 | 6.1 | 5.4 | 6.5 | 5.2 | 40 |
| Kidney & Renal Pelvis | 2.0 | 0.6 | 0.1 | 0.3 | 0.3 | 0.3 | 2.2 | 3.7 | 9.7 | 13.3 | 28.0 | 42.6 | 61.5 | 70.7 | 83.6 | 92.8 | 92.9 | 66.4 | 65 |
| Larynx | - | - | - | - | - | - | 0.4 | 0.8 | 1.6 | 4.6 | 9.7 | 22.3 | 27.6 | 33.9 | 39.7 | 38.9 | 38.6 | 32.9 | 66 |
| Leukemia | 6.5 | 3.7 | 2.9 | 2.8 | 2.6 | 3.0 | 3.9 | 3.1 | 6.4 | 8.5 | 11.8 | 22.0 | 31.9 | 40.3 | 60.2 | 80.8 | 92.1 | 92.8 | 67 |
| Liver & Intrahepatic Bile Ducts | 0.9 | - | 0.1 | - | 0.2 | 0.2 | 0.7 | 1.2 | 3.2 | 11.4 | 16.1 | 16.6 | 26.0 | 31.0 | 40.6 | 40.0 | 38.6 | 33.5 | 64 |
| Melanoma of Skin | 0.1 | - | 0.2 | 1.5 | 3.0 | 5.6 | 8.7 | 12.2 | 16.2 | 23.5 | 38.8 | 43.6 | 60.6 | 72.7 | 94.7 | 108.6 | 123.3 | 122.4 | 63 |
| Multiple Myeloma | - | - | - | - | - | 0.3 | 0.2 | 0.8 | 1.9 | 3.9 | 6.5 | 11.7 | 18.2 | 26.8 | 30.3 | 39.5 | 52.1 | 50.9 | 70 |
| Non-Hodgkin Lymphoma | 0.1 | 1.3 | 1.5 | 2.8 | 3.9 | 5.2 | 7.2 | 9.0 | 13.3 | 19.3 | 26.7 | 43.3 | 50.9 | 72.1 | 96.2 | 123.9 | 140.3 | 142.4 | 66 |
| Oral Cavity & Pharynx | 0.2 | 0.2 | 0.2 | 0.6 | 0.6 | 0.9 | 1.6 | 2.5 | 8.3 | 21.2 | 31.5 | 53.1 | 55.6 | 62.5 | 59.3 | 62.9 | 60.8 | 63.1 | 62 |
| Pancreas | - | - | - | 0.2 | - | - | 0.5 | 1.0 | 3.3 | 5.1 | 12.9 | 26.6 | 36.3 | 48.8 | 65.7 | 78.9 | 102.9 | 101.8 | 70 |
| Prostate | - | - | - | 0.9 | - | 0.1 | 0.2 | 0.9 | 9.8 | 54.5 | 191.9 | 447.2 | 737.4 | 1007.8 | 1072.6 | 977.2 | 693.5 | 682.2 | 68 |
| Stomach | - | - | - | - | 0.3 | 0.5 | 0.9 | 1.7 | 2.9 | 6.1 | 10.9 | 15.2 | 34.3 | 42.3 | 52.1 | 69.1 | 100.3 | 119.2 | 71 |
| Testis | 0.4 | - | 0.1 | 3.7 | 9.9 | 14.4 | 15.5 | 15.7 | 10.7 | 8.1 | 4.4 | 2.2 | 1.8 | 1.8 | 1.5 | 1.9 | - | 1.3 | 35 |
| Thyroid | 0.1 | 0.3 | 0.3 | 0.6 | 2.0 | 2.9 | 4.0 | 5.8 | 6.0 | 6.4 | 8.7 | 9.4 | 10.3 | 12.3 | 11.3 | 10.6 | 6.9 | 4.5 | 50 |
| Urinary Bladder | 0.1 | - | - | - | 0.4 | 0.6 | 1.9 | 3.6 | 7.9 | 16.5 | 30.3 | 66.3 | 121.1 | 168.4 | 257.0 | 321.5 | 377.8 | 417.5 | 72 |
| Other Sites | 6.6 | 1.6 | 2.9 | 3.4 | 4.4 | 6.1 | 6.4 | 10.7 | 14.4 | 24.3 | 37.7 | 54.3 | 100.7 | 120.5 | 176.1 | 253.1 | 320.9 | 374.9 | 70 |

¹ per 100,000 ² Breast *in situ* is excluded from all sites ³ Dashed out age groups had no incident cases.

Table 2.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGES FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
FEMALES

| Cancer Site/Type | Age Groups | | | | | | | | | | | | | | | | | | Median |
|-------------------------------------|--------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85+ | Age |
| All Sites | 22.8 | 11.0 | 11.9 | 19.8 | 37.3 | 62.6 | 111.3 | 177.8 | 296.3 | 472.1 | 674.3 | 982.3 | 1277.4 | 1477.4 | 1746.0 | 2011.6 | 2161.5 | 1958.7 | 67 |
| Brain & Other Nervous System | 4.2 | 3.7 | 2.3 | 1.5 | 2.1 | 2.4 | 3.4 | 3.0 | 5.6 | 6.2 | 8.4 | 11.8 | 13.2 | 15.9 | 16.3 | 22.7 | 21.5 | 17.4 | 59 |
| Breast | ² | - | 0.1 | 0.1 | 1.6 | 7.2 | 28.6 | 66.5 | 133.3 | 221.8 | 269.6 | 364.6 | 420.5 | 415.5 | 446.4 | 489.2 | 449.9 | 380.1 | 62 |
| Breast <i>in situ</i> ^{2s} | - | - | - | - | 0.1 | 1.3 | 3.5 | 19.7 | 65.8 | 105.4 | 130.7 | 140.1 | 143.3 | 126.1 | 128.4 | 111.1 | 84.7 | 38.1 | 56 |
| Bronchus & Lung | 0.1 | 0.1 | - | 0.2 | 0.5 | 1.0 | 2.2 | 5.6 | 15.2 | 33.1 | 66.3 | 132.1 | 206.9 | 274.5 | 336.9 | 358.9 | 336.5 | 208.8 | 71 |
| Cervix Uteri | 0.1 | - | - | 0.2 | 1.2 | 4.0 | 7.5 | 9.0 | 13.0 | 10.3 | 11.6 | 10.9 | 13.1 | 12.0 | 11.3 | 12.1 | 10.3 | 8.1 | 50 |
| Colon / Rectum | - | - | 0.1 | 0.1 | 0.9 | 1.5 | 3.3 | 7.9 | 14.6 | 27.5 | 49.5 | 76.5 | 118.7 | 167.7 | 223.3 | 313.6 | 408.1 | 427.5 | 75 |
| Corpus Uteri & Uterus, NOS | - | - | - | 0.1 | 0.3 | 1.8 | 3.2 | 7.0 | 12.5 | 29.5 | 65.6 | 96.4 | 112.4 | 104.6 | 97.2 | 84.9 | 89.7 | 61.3 | 62 |
| Esophagus | - | - | - | - | - | 0.1 | - | 0.3 | 0.5 | 1.1 | 2.8 | 4.4 | 5.6 | 10.3 | 11.8 | 15.0 | 16.0 | 19.3 | 74 |
| Hodgkin Lymphoma | - | 0.1 | 1.8 | 4.2 | 6.2 | 4.8 | 4.9 | 3.5 | 2.7 | 1.5 | 2.4 | 2.0 | 2.3 | 3.7 | 3.8 | 4.1 | 4.5 | 2.3 | 35 |
| Kidney & Renal Pelvis | 1.5 | 0.6 | 0.4 | 0.4 | 0.6 | 0.4 | 1.2 | 2.3 | 5.5 | 8.6 | 12.6 | 21.3 | 29.0 | 35.2 | 43.5 | 45.6 | 48.0 | 32.0 | 68 |
| Larynx | - | - | 0.1 | - | - | 0.1 | 0.2 | 0.1 | 0.7 | 1.4 | 2.7 | 5.0 | 8.4 | 7.3 | 9.8 | 5.4 | 6.0 | 3.3 | 66 |
| Leukemia | 9.3 | 2.9 | 1.5 | 2.1 | 1.5 | 2.1 | 2.5 | 3.6 | 4.4 | 7.5 | 7.7 | 11.4 | 22.6 | 20.8 | 36.5 | 43.3 | 56.3 | 59.0 | 71 |
| Liver & Intrahepatic Bile Ducts | 0.1 | 0.1 | - | - | 0.2 | 0.4 | 0.3 | 0.1 | 0.6 | 1.5 | 2.9 | 5.3 | 6.4 | 10.3 | 9.5 | 14.1 | 16.9 | 17.9 | 73 |
| Melanoma of Skin | 0.1 | - | 0.4 | 1.8 | 5.6 | 10.1 | 15.0 | 16.9 | 17.0 | 22.3 | 28.4 | 33.1 | 35.0 | 38.4 | 46.7 | 48.7 | 38.7 | 43.0 | 56 |
| Multiple Myeloma | - | - | - | - | - | 0.2 | 0.2 | 0.2 | 1.0 | 2.4 | 4.2 | 7.3 | 10.8 | 15.2 | 24.3 | 22.4 | 29.4 | 24.6 | 73 |
| Non-Hodgkin Lymphoma | 0.6 | 0.5 | 0.7 | 1.4 | 2.1 | 3.7 | 4.5 | 5.9 | 9.5 | 13.6 | 17.1 | 32.2 | 42.2 | 56.7 | 71.1 | 86.4 | 100.0 | 81.3 | 70 |
| Oral Cavity & Pharynx | - | 0.2 | 0.2 | 0.5 | 0.8 | 1.0 | 1.9 | 2.3 | 3.9 | 6.7 | 11.6 | 14.6 | 21.9 | 21.8 | 27.2 | 27.0 | 28.6 | 29.5 | 66 |
| Ovary | 0.2 | 0.5 | 0.7 | 1.0 | 1.9 | 1.7 | 3.8 | 5.9 | 10.1 | 19.3 | 27.2 | 36.1 | 39.8 | 46.0 | 50.3 | 51.4 | 59.4 | 52.2 | 64 |
| Pancreas | - | - | 0.1 | - | - | 0.2 | 0.4 | 1.5 | 2.0 | 4.0 | 9.6 | 14.9 | 26.0 | 38.6 | 54.5 | 72.3 | 81.2 | 85.2 | 75 |
| Stomach | - | - | - | - | 0.1 | 0.3 | 1.3 | 1.1 | 1.7 | 3.2 | 3.6 | 7.0 | 9.2 | 15.6 | 22.8 | 28.9 | 46.1 | 57.8 | 77 |
| Thyroid | - | 0.1 | 0.7 | 3.3 | 8.6 | 14.7 | 20.7 | 24.1 | 24.9 | 24.8 | 24.0 | 21.1 | 21.4 | 20.8 | 14.0 | 14.4 | 12.4 | 7.9 | 45 |
| Urinary Bladder | - | - | - | 0.1 | - | 0.3 | 0.6 | 2.1 | 3.4 | 4.1 | 11.4 | 22.8 | 36.6 | 49.1 | 65.0 | 77.5 | 79.7 | 85.5 | 73 |
| Other Sites | 6.6 | 2.3 | 2.9 | 3.0 | 3.1 | 4.6 | 5.6 | 8.8 | 14.0 | 22.0 | 35.1 | 51.4 | 75.5 | 97.1 | 124.1 | 173.7 | 222.2 | 254.7 | 73 |

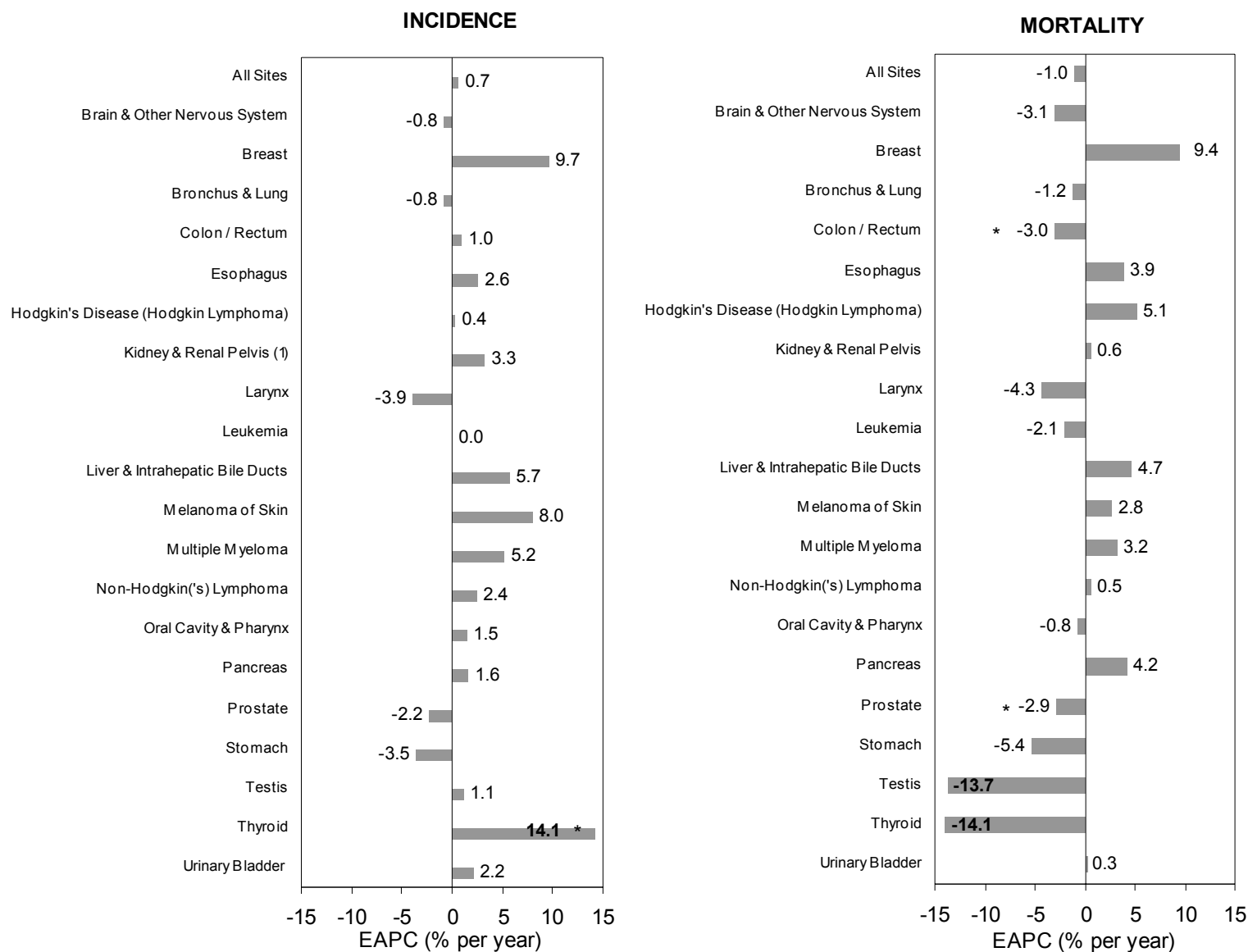
¹per 100,000 ²Breast *in situ* is excluded from all sites. ³Dashed out age groups had no incident cases.

Table 3.
AGE-SPECIFIC INCIDENCE RATES¹ AND MEDIAN AGES FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
TOTAL

| Cancer Site/Type | Age Groups | | | | | | | | | | | | | | | | | | Median |
|--|----------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85+ | Age |
| All Sites | 21.8 | 11.8 | 12.4 | 21.2 | 37.3 | 58.0 | 90.5 | 136.8 | 230.1 | 395.0 | 655.2 | 1086.4 | 1560.3 | 1956.8 | 2333.7 | 2579.5 | 2634.5 | 2346.3 | 68 |
| Brain & Other Nervous System | 3.9 | 4.0 | 2.9 | 2.1 | 2.2 | 3.0 | 3.5 | 3.9 | 5.7 | 7.3 | 9.1 | 15.0 | 15.9 | 18.3 | 20.1 | 25.1 | 25.6 | 20.3 | 57 |
| Breast | - ³ | - | * | * | 0.8 | 3.7 | 14.6 | 33.8 | 68.3 | 114.2 | 139.9 | 190.8 | 223.9 | 229.2 | 256.0 | 297.9 | 293.6 | 282.0 | 62 |
| Breast <i>in situ</i>² | - | - | - | * | * | 0.6 | 1.8 | 10.0 | 33.6 | 54.2 | 67.5 | 73.0 | 75.9 | 69.2 | 73.2 | 67.0 | 55.4 | 28.0 | 56 |
| Bronchus & Lung | 0.1 | * | - | 0.2 | 0.4 | 1.4 | 2.1 | 5.1 | 16.0 | 33.0 | 69.7 | 141.0 | 230.5 | 321.1 | 416.4 | 450.0 | 428.0 | 271.2 | 71 |
| Cervix Uteri | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Colon / Rectum | 0.1 | - | 0.1 | 0.1 | 0.8 | 1.7 | 4.0 | 7.5 | 15.3 | 29.9 | 58.2 | 97.8 | 147.8 | 208.2 | 278.4 | 365.5 | 456.2 | 463.2 | 73 |
| Corpus Uteri & Uterus, NOS | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Esophagus | - | - | - | - | - | 0.1 | 0.2 | 0.6 | 1.5 | 3.9 | 7.8 | 14.5 | 20.6 | 27.9 | 30.6 | 33.5 | 33.3 | 31.4 | 69 |
| Hodgkin Lymphoma | 0.1 | 0.4 | 1.4 | 3.8 | 6.3 | 5.3 | 4.3 | 3.9 | 3.2 | 3.3 | 2.7 | 3.2 | 3.1 | 4.3 | 4.8 | 4.7 | 5.2 | 3.1 | 38 |
| Kidney & Renal Pelvis | 1.8 | 0.6 | 0.2 | 0.3 | 0.4 | 0.4 | 1.7 | 3.0 | 7.5 | 10.9 | 20.1 | 31.6 | 44.4 | 51.4 | 60.8 | 64.4 | 64.1 | 41.1 | 66 |
| Larynx | - | - | * | - | - | * | 0.3 | 0.5 | 1.1 | 3.0 | 6.1 | 13.3 | 17.5 | 19.4 | 22.7 | 18.8 | 17.6 | 11.1 | 66 |
| Leukemia | 7.8 | 3.3 | 2.2 | 2.5 | 2.0 | 2.5 | 3.2 | 3.3 | 5.4 | 8.0 | 9.7 | 16.6 | 27.0 | 29.7 | 46.8 | 58.2 | 69.2 | 67.9 | 69 |
| Liver & Intrahepatic Bile Ducts | 0.5 | * | * | - | 0.2 | 0.3 | 0.5 | 0.7 | 1.9 | 6.3 | 9.3 | 10.7 | 15.7 | 19.8 | 22.9 | 24.4 | 24.6 | 22.0 | 67 |
| Melanoma of Skin | 0.1 | - | 0.3 | 1.6 | 4.3 | 7.9 | 11.9 | 14.6 | 16.7 | 22.9 | 33.4 | 38.1 | 47.3 | 54.1 | 67.5 | 72.6 | 69.0 | 64.0 | 60 |
| Multiple Myeloma | - | - | - | - | - | 0.2 | 0.2 | 0.5 | 1.4 | 3.1 | 5.3 | 9.4 | 14.3 | 20.5 | 26.9 | 29.2 | 37.4 | 31.6 | 71 |
| Non-Hodgkin Lymphoma | 0.4 | 0.9 | 1.1 | 2.1 | 3.0 | 4.5 | 5.9 | 7.4 | 11.3 | 16.3 | 21.9 | 37.6 | 46.3 | 63.7 | 82.0 | 101.3 | 114.4 | 97.5 | 68 |
| Oral Cavity & Pharynx | 0.1 | 0.2 | 0.2 | 0.5 | 0.7 | 1.0 | 1.8 | 2.4 | 6.1 | 13.8 | 21.2 | 33.1 | 37.8 | 40.4 | 41.1 | 41.3 | 40.0 | 38.4 | 63 |
| Ovary | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Pancreas | - | - | * | 0.1 | - | 0.1 | 0.4 | 1.3 | 2.7 | 4.5 | 11.2 | 20.5 | 30.8 | 43.2 | 59.3 | 75.1 | 88.9 | 89.6 | 73 |
| Prostate | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Stomach | - | - | - | - | 0.2 | 0.4 | 1.1 | 1.4 | 2.3 | 4.6 | 7.2 | 11.0 | 21.0 | 27.8 | 35.5 | 44.9 | 65.3 | 74.1 | 73 |
| Testis | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Thyroid | 0.1 | 0.2 | 0.5 | 1.9 | 5.4 | 8.9 | 12.5 | 15.1 | 15.7 | 15.8 | 16.6 | 15.5 | 16.2 | 16.9 | 12.8 | 12.9 | 10.5 | 7.0 | 46 |
| Urinary Bladder | 0.1 | - | - | * | 0.2 | 0.4 | 1.3 | 2.9 | 5.6 | 10.1 | 20.5 | 43.7 | 76.5 | 103.6 | 148.1 | 174.7 | 185.4 | 173.4 | 72 |
| Other Sites | 6.6 | 2.0 | 2.9 | 3.2 | 3.7 | 5.3 | 6.0 | 9.7 | 14.2 | 23.1 | 36.4 | 52.8 | 87.4 | 107.8 | 146.7 | 205.3 | 257.4 | 286.8 | 72 |

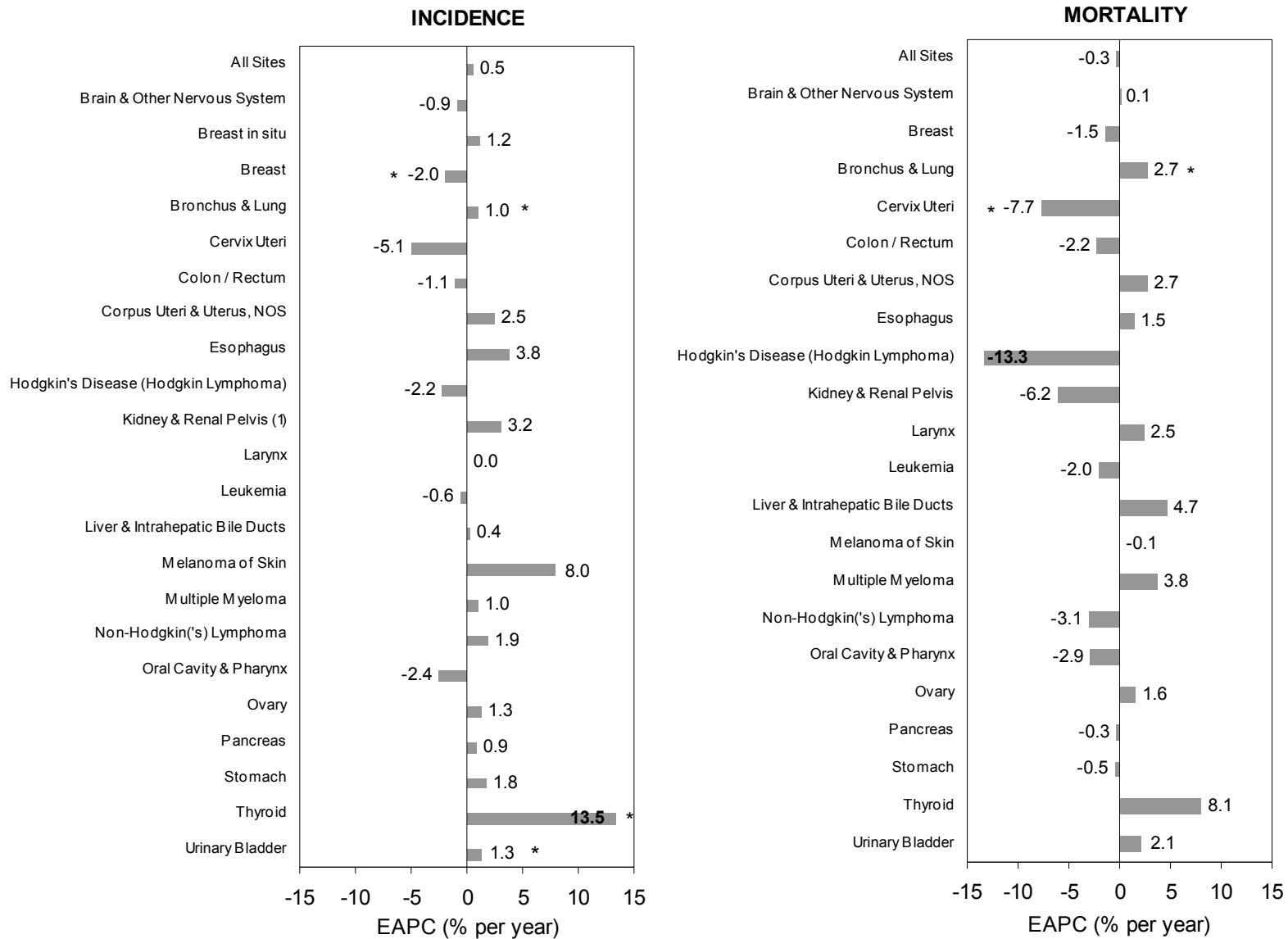
¹ per 100,000 ² Breast *in situ* is excluded from all sites ³ Dashed out age groups had no incident cases or are found only in one sex. * age-specific incidence rates are less than 0.1.

Figure 5.
Estimated Annual Percent Change (EAPC) in Age-Adjusted Cancer Rates Among Males, Massachusetts, 1999-2003



1 Massachusetts rates for this site include codes 64.9 & 65.9 (ICD-O-3) only for comparability. Massachusetts hospital coding conventions may have assigned some cases to a "not otherwise specified" category. * EAPC is statistically significant ($p < 0.05$).

Figure 6.
Estimated Annual Percent Change (EAPC) in Age-Adjusted Cancer Rates Among Females, Massachusetts, 1999-2003



¹ Massachusetts rates for this site include codes 64.9 & 65.9 (ICD-O-3) only for comparability. Massachusetts hospital coding conventions may have assigned some cases to a "not otherwise specified" category. * EAPC is statistically significant (p<0.05).

Table 4.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
MALES

| Cancer Site/Type | 1999 | 2000 | 2001 | 2002 | 2003 |
|--|-------|-------|-------|-------|-------|
| All Sites | 608.9 | 615.9 | 631.6 | 642.5 | 616.2 |
| Brain and Other Nervous System | 8.4 | 9.5 | 8.6 | 8.4 | 8.6 |
| Breast³ | 1.5 | 1.4 | 0.9 | 1.8 | 2.1 |
| Bronchus & Lung | 91.0 | 88.0 | 89.3 | 91.1 | 85.9 |
| Colon / Rectum | 71.0 | 69.4 | 74.5 | 73.6 | 72.3 |
| Esophagus | 11.2 | 11.3 | 10.7 | 12.7 | 12.0 |
| Hodgkin Lymphoma | 4.0 | 3.3 | 3.8 | 3.8 | 3.8 |
| Kidney & Renal Pelvis | 18.4 | 17.4 | 18.9 | 19.5 | 20.4 |
| Larynx | 8.9 | 8.7 | 7.0 | 7.6 | 7.8 |
| Leukemia | 15.2 | 14.4 | 14.5 | 14.6 | 15.1 |
| Liver & Intrahepatic Bile Ducts | 7.2 | 8.7 | 9.4 | 9.7 | 9.0 |
| Melanoma of Skin | 20.6 | 21.3 | 27.5 | 27.7 | 26.5 |
| Multiple Myeloma | 5.8 | 6.5 | 7.6 | 7.6 | 6.9 |
| Non-Hodgkin Lymphoma | 23.3 | 22.6 | 24.5 | 24.7 | 25.1 |
| Oral Cavity & Pharynx | 16.8 | 17.5 | 15.9 | 17.7 | 18.0 |
| Pancreas | 13.8 | 12.6 | 13.1 | 14.3 | 14.0 |
| Prostate | 185.9 | 192.1 | 192.8 | 185.9 | 168.7 |
| Stomach | 12.4 | 13.8 | 12.6 | 11.2 | 11.5 |
| Testis | 6.3 | 6.2 | 6.0 | 6.9 | 6.3 |
| Thyroid | 3.8 | 4.1 | 4.1 | 5.6 | 6.3 |
| Urinary Bladder | 45.3 | 48.4 | 46.5 | 50.0 | 49.6 |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 males

³ Incidence rates for breast *in situ* are not presented because there are less than 20 cases.

Table 5.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
FEMALES

| Cancer Site/Type | 1999 | 2000 | 2001 | 2002 | 2003 |
|--|-------|-------|-------|-------|-------|
| All Sites (Excluding Breast <i>in situ</i>) | 456.6 | 453.2 | 462.2 | 470.8 | 459.7 |
| Brain and Other Nervous System | 6.6 | 6.8 | 6.1 | 6.2 | 6.6 |
| Breast | 146.2 | 144.7 | 141.5 | 139.3 | 134.9 |
| Breast <i>in situ</i>³ | 46.9 | 50.3 | 47.9 | 49.4 | 50.2 |
| Bronchus & Lung | 60.6 | 61.1 | 62.6 | 62.9 | 62.7 |
| Cervix Uteri | 6.9 | 7.1 | 6.5 | 6.9 | 5.4 |
| Colon / Rectum | 51.6 | 49.6 | 53.9 | 50.9 | 48.3 |
| Corpus Uteri & Uterus, NOS | 28.9 | 26.2 | 27.1 | 31.7 | 29.7 |
| Esophagus | 2.2 | 2.4 | 2.6 | 2.7 | 2.5 |
| Hodgkin Lymphoma | 3.1 | 3.2 | 2.8 | 2.4 | 3.2 |
| Kidney & Renal Pelvis | 9.6 | 8.6 | 9.7 | 10.6 | 10.1 |
| Larynx | 1.8 | 1.9 | 1.7 | 1.4 | 2.1 |
| Leukemia | 9.9 | 9.8 | 9.0 | 9.4 | 9.8 |
| Liver & Intrahepatic Bile Ducts | 2.6 | 2.6 | 2.4 | 2.5 | 2.7 |
| Melanoma of Skin | 14.0 | 14.7 | 17.8 | 20.0 | 17.6 |
| Multiple Myeloma | 4.0 | 4.1 | 4.1 | 4.3 | 4.1 |
| Non-Hodgkin Lymphoma | 17.3 | 15.1 | 17.0 | 18.3 | 17.3 |
| Oral Cavity & Pharynx | 7.7 | 6.5 | 6.9 | 6.7 | 6.7 |
| Ovary | 13.7 | 15.1 | 15.7 | 14.9 | 14.7 |
| Pancreas | 10.4 | 10.6 | 10.9 | 11.0 | 10.7 |
| Stomach | 4.8 | 5.5 | 5.3 | 5.2 | 5.4 |
| Thyroid | 10.7 | 13.4 | 13.3 | 15.5 | 18.7 |
| Urinary Bladder | 12.4 | 12.3 | 12.7 | 12.9 | 12.9 |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 females

³ Breast *in situ* is excluded from all sites

Table 6.
ANNUAL AGE-ADJUSTED¹ INCIDENCE RATES² FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
TOTAL

| Cancer Site/Type | 1999 | 2000 | 2001 | 2002 | 2003 |
|--|----------------|-------|-------|-------|-------|
| All Sites (Excluding Breast <i>in situ</i>) | 516.1 | 517.5 | 529.3 | 537.7 | 520.6 |
| Brain and Other Nervous System | 7.4 | 8.0 | 7.2 | 7.1 | 7.5 |
| Breast | 81.2 | 80.0 | 77.9 | 77.3 | 74.7 |
| Breast <i>in situ</i>³ | 25.1 | 27.0 | 25.7 | 26.5 | 26.9 |
| Bronchus & Lung | 73.0 | 71.8 | 73.3 | 73.8 | 71.8 |
| Cervix Uteri | - ⁴ | - | - | - | - |
| Colon / Rectum | 59.6 | 57.9 | 62.5 | 60.6 | 58.3 |
| Corpus Uteri & Uterus, NOS | - | - | - | - | - |
| Esophagus | 6.0 | 6.2 | 6.1 | 7.0 | 6.6 |
| Hodgkin Lymphoma | 3.5 | 3.3 | 3.2 | 3.1 | 3.4 |
| Kidney & Renal Pelvis | 13.5 | 12.4 | 13.9 | 14.5 | 14.6 |
| Larynx | 4.9 | 4.9 | 3.9 | 4.1 | 4.5 |
| Leukemia | 12.1 | 11.8 | 11.3 | 11.6 | 11.9 |
| Liver & Intrahepatic Bile Ducts | 4.7 | 5.3 | 5.5 | 5.7 | 5.5 |
| Melanoma of Skin | 16.7 | 17.3 | 21.6 | 22.8 | 21.2 |
| Multiple Myeloma | 4.8 | 5.0 | 5.5 | 5.7 | 5.3 |
| Non-Hodgkin Lymphoma | 19.9 | 18.3 | 20.3 | 20.9 | 20.5 |
| Oral Cavity & Pharynx | 11.7 | 11.5 | 10.8 | 11.7 | 11.9 |
| Ovary | - | - | - | - | - |
| Pancreas | 11.9 | 11.6 | 11.9 | 12.4 | 12.0 |
| Prostate | - | - | - | - | - |
| Stomach | 7.9 | 8.9 | 8.4 | 7.7 | 7.9 |
| Testis | - | - | - | - | - |
| Thyroid | 7.3 | 8.9 | 8.9 | 10.7 | 12.7 |
| Urinary Bladder | 25.7 | 27.1 | 26.4 | 27.7 | 27.5 |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 total population

³ Breast *in situ* is excluded from all sites

⁴ Dashed out cancers found in only one sex

Table 7.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
MALES

| Cancer Site / Type | 1999 | 2000 | 2001 | 2002 | 2003 |
|--|-------------|-------------|-------------|-------------|-------------|
| All Sites | 262.6 | 258.8 | 252.0 | 256.2 | 250.4 |
| Brain & Other Nervous System | 5.8 | 5.9 | 5.3 | 5.7 | 5.0 |
| Breast | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 |
| Bronchus & Lung | 73.5 | 73.6 | 69.9 | 72.1 | 70.0 |
| Colon / Rectum | 27.6 | 28.6 | 26.7 | 26.3 | 24.7 |
| Esophagus | 9.9 | 9.8 | 9.2 | 10.3 | 11.7 |
| Hodgkin Lymphoma | 0.9 | 0.2 | 0.7 | 0.9 | 0.6 |
| Kidney & Renal Pelvis | 5.5 | 6.6 | 6.0 | 5.5 | 6.2 |
| Larynx | 3.0 | 2.7 | 3.0 | 2.9 | 2.3 |
| Leukemia | 10.2 | 10.1 | 9.9 | 8.5 | 10.0 |
| Liver & Intrahepatic Bile Ducts | 6.6 | 6.6 | 8.4 | 7.9 | 7.6 |
| Melanoma of Skin | 4.0 | 4.7 | 4.4 | 4.2 | 4.8 |
| Multiple Myeloma | 4.4 | 4.1 | 4.6 | 5.1 | 4.6 |
| Non-Hodgkin Lymphoma | 10.7 | 8.8 | 9.7 | 10.4 | 10.1 |
| Oral Cavity & Pharynx | 4.5 | 4.0 | 4.1 | 4.8 | 4.0 |
| Pancreas | 12.6 | 12.9 | 12.4 | 14.1 | 14.8 |
| Prostate | 32.9 | 31.1 | 30.6 | 29.6 | 29.2 |
| Stomach | 7.1 | 8.8 | 7.2 | 6.8 | 6.2 |
| Testis | 0.4 | 0.3 | 0.1 | 0.4 | 0.2 |
| Thyroid | 0.5 | 0.4 | 0.7 | 0.3 | 0.3 |
| Urinary Bladder | 9.5 | 8.1 | 10.2 | 8.4 | 9.4 |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 males

Table 8.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
FEMALES

| Cancer Site/Type | 1999 | 2000 | 2001 | 2002 | 2003 |
|--|-------------|-------------|-------------|-------------|-------------|
| All Sites | 171.6 | 175.0 | 173.2 | 174.6 | 169.6 |
| Brain & Other Nervous System | 3.7 | 3.7 | 3.0 | 3.4 | 3.9 |
| Breast | 27.2 | 26.9 | 26.9 | 27.0 | 25.3 |
| Bronchus & Lung | 41.0 | 44.3 | 45.4 | 45.5 | 46.4 |
| Cervix Uteri | 1.8 | 2.0 | 1.6 | 1.6 | 1.3 |
| Colon / Rectum | 18.8 | 17.8 | 17.6 | 19.0 | 16.3 |
| Corpus Uteri & Uterus, NOS | 4.0 | 4.4 | 4.2 | 4.6 | 4.5 |
| Esophagus | 1.9 | 2.0 | 1.8 | 1.8 | 2.1 |
| Hodgkin Lymphoma | 0.6 | 0.4 | 0.6 | 0.3 | 0.3 |
| Kidney & Renal Pelvis | 3.1 | 2.4 | 2.8 | 2.3 | 2.3 |
| Larynx | 0.5 | 0.6 | 0.5 | 0.7 | 0.5 |
| Leukemia | 6.2 | 5.7 | 5.6 | 5.3 | 5.8 |
| Liver & Intrahepatic Bile Ducts | 2.3 | 2.0 | 2.8 | 2.5 | 2.6 |
| Melanoma of Skin | 1.8 | 2.5 | 1.9 | 1.8 | 2.1 |
| Multiple Myeloma | 2.9 | 2.9 | 3.1 | 3.5 | 3.2 |
| Non-Hodgkin Lymphoma | 7.3 | 6.6 | 7.1 | 6.9 | 6.2 |
| Oral Cavity & Pharynx | 1.7 | 1.9 | 1.7 | 1.5 | 1.7 |
| Ovary | 8.7 | 9.1 | 9.1 | 9.9 | 9.0 |
| Pancreas | 9.9 | 10.6 | 10.1 | 10.2 | 9.9 |
| Stomach | 3.5 | 3.3 | 3.5 | 3.9 | 3.1 |
| Thyroid | 0.4 | 0.5 | 0.4 | 0.4 | 0.7 |
| Urinary Bladder | 2.6 | 2.8 | 2.8 | 3.3 | 2.7 |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 females

Table 9.
ANNUAL AGE-ADJUSTED¹ MORTALITY RATES² FOR SELECTED CANCER SITES
Massachusetts, 1999-2003
TOTAL

| Cancer Site/Type | 1999 | 2000 | 2001 | 2002 | 2003 |
|---------------------------------|----------------|-------|-------|-------|-------|
| All Sites | 206.0 | 206.6 | 202.4 | 204.6 | 199.3 |
| Brain & Other Nervous System | 4.7 | 4.7 | 4.0 | 4.4 | 4.4 |
| Breast | 15.8 | 15.7 | 15.6 | 15.7 | 14.8 |
| Bronchus & Lung | 54.0 | 56.0 | 54.9 | 55.9 | 55.8 |
| Cervix Uteri | - ³ | - | - | - | - |
| Colon / Rectum | 22.4 | 22.1 | 21.3 | 22.1 | 19.4 |
| Corpus Uteri & Uterus, NOS | - | - | - | - | - |
| Esophagus | 5.3 | 5.3 | 4.9 | 5.4 | 6.1 |
| Hodgkin Lymphoma | 0.7 | 0.3 | 0.6 | 0.6 | 0.5 |
| Kidney & Renal Pelvis | 4.1 | 4.1 | 4.1 | 3.6 | 3.9 |
| Larynx | 1.5 | 1.5 | 1.5 | 1.6 | 1.3 |
| Leukemia | 7.8 | 7.5 | 7.2 | 6.6 | 7.4 |
| Liver & Intrahepatic Bile Ducts | 4.2 | 4.1 | 5.2 | 4.7 | 4.7 |
| Melanoma of Skin | 2.7 | 3.4 | 2.9 | 2.7 | 3.2 |
| Multiple Myeloma | 3.5 | 3.3 | 3.7 | 4.1 | 3.8 |
| Non-Hodgkin Lymphoma | 8.8 | 7.5 | 8.2 | 8.2 | 7.6 |
| Oral Cavity & Pharynx | 2.9 | 2.8 | 2.7 | 2.9 | 2.6 |
| Ovary | - | - | - | - | - |
| Pancreas | 11.1 | 11.7 | 11.2 | 11.7 | 11.9 |
| Prostate | - | - | - | - | - |
| Stomach | 4.9 | 5.5 | 5.0 | 5.1 | 4.4 |
| Testis | - | - | - | - | - |
| Thyroid | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 |
| Urinary Bladder | 5.0 | 4.8 | 5.5 | 5.2 | 5.1 |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000 total population

³ Dashed out cancers found in only one sex

Table 10.
FIVE LEADING CANCER INCIDENCE RATES BY RACE/ETHNICITY AND SEX
Massachusetts, 1999-2003

MALES

| AGE-ADJUSTED¹ INCIDENCE RATE² | | | | |
|--|----------------------------|----------------------------|--|------------------------------|
| RANK | White, non-Hispanic | Black, non-Hispanic | Asian, non-Hispanic | Hispanic |
| 1 | Prostate 178.5 | Prostate 308.1 | Prostate 82.9 | Prostate 187.8 |
| 2 | Bronchus & Lung 89.7 | Bronchus & Lung 94.2 | Bronchus & Lung 53.9 | Bronchus & Lung 54.2 |
| 3 | Colon / Rectum 72.1 | Colon / Rectum 62.3 | Colon / Rectum 50.9 | Colon / Rectum 52.3 |
| 4 | Urinary Bladder 49.5 | Urinary Bladder 23.4 | Liver & Intrahepatic Bile Ducts 30.1 | Urinary Bladder 28.2 |
| 5 | Melanoma 25.4 | Stomach 22.4 | Non-Hodgkin Lymphoma 18.5 | Non-Hodgkin Lymphoma 23.3 |

FEMALES

| AGE-ADJUSTED¹ INCIDENCE RATE² | | | | |
|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| RANK | White, non-Hispanic | Black, non-Hispanic | Asian, non-Hispanic | Hispanic |
| 1 | Breast 143.5 | Breast 112.8 | Breast 68.9 | Breast 92.9 |
| 2 | Bronchus & Lung 63.1 | Bronchus & Lung 54.0 | Colon / Rectum 37.9 | Colon / Rectum 38.3 |
| 3 | Colon / Rectum 50.6 | Colon / Rectum 52.8 | Bronchus & Lung 36.0 | Bronchus & Lung 29.2 |
| 4 | Corpus Uteri & Uterus, NOS 28.8 | Corpus Uteri & Uterus, NOS 20.5 | Thyroid 18.5 | Corpus Uteri & Uterus, NOS 25.7 |
| 5 | Melanoma 17.4 | Non-Hodgkin Lymphoma 14.2 | Corpus Uteri & Uterus, NOS 15.4 | Non-Hodgkin Lymphoma 17.7 |

¹ Age-adjusted to the 2000 U.S. Standard Population ² per 100,000

Table 11.
INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 1999-2003
MALES

| Cancer Site/Type | All Races ² | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|------------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|----------|------------|
| | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases |
| All Sites | 87573 | 100.0 | 79629 | 100.0 | 3292 | 100.0 | 1042 | 100.0 | 1986 | 100.0 |
| Brain & Other Nervous System | 1272 | 1.5 | 1146 | 1.4 | 30 | 0.9 | 24 | 2.3 | 51 | 2.6 |
| Breast ³ | 214 | 0.2 | 193 | 0.2 | 10 | 0.3 | 3 | 0.3 | 3 | 0.2 |
| Bronchus & Lung | 12419 | 14.2 | 11585 | 14.5 | 420 | 12.8 | 141 | 13.5 | 177 | 8.9 |
| Colon / Rectum | 9941 | 11.4 | 9196 | 11.5 | 286 | 8.7 | 143 | 13.7 | 189 | 9.5 |
| Esophagus | 1624 | 1.9 | 1494 | 1.9 | 61 | 1.9 | 13 | 1.2 | 42 | 2.1 |
| Hodgkin Lymphoma | 568 | 0.6 | 513 | 0.6 | 14 | 0.4 | 4 | 0.4 | 24 | 1.2 |
| Kidney & Renal Pelvis | 2709 | 3.1 | 2476 | 3.1 | 93 | 2.8 | 22 | 2.1 | 69 | 3.5 |
| Larynx | 1134 | 1.3 | 1015 | 1.3 | 56 | 1.7 | 8 | 0.8 | 36 | 1.8 |
| Leukemia | 2076 | 2.4 | 1905 | 2.4 | 54 | 1.6 | 20 | 1.9 | 58 | 2.9 |
| Liver & Intrahepatic Bile Ducts | 1261 | 1.4 | 979 | 1.2 | 73 | 2.2 | 113 | 10.8 | 75 | 3.8 |
| Melanoma of Skin | 3555 | 4.1 | 3314 | 4.2 | 5 | 0.2 | 6 | 0.6 | 17 | 0.9 |
| Multiple Myeloma | 952 | 1.1 | 856 | 1.1 | 63 | 1.9 | 5 | 0.5 | 18 | 0.9 |
| Non-Hodgkin Lymphoma | 3411 | 3.9 | 3052 | 3.8 | 123 | 3.7 | 60 | 5.8 | 118 | 5.9 |
| Oral Cavity & Pharynx | 2486 | 2.8 | 2203 | 2.8 | 101 | 3.1 | 50 | 4.8 | 90 | 4.5 |
| Pancreas | 1872 | 2.1 | 1715 | 2.2 | 76 | 2.3 | 18 | 1.7 | 37 | 1.9 |
| Prostate | 26192 | 29.9 | 23335 | 29.3 | 1394 | 42.3 | 216 | 20.7 | 605 | 30.5 |
| Stomach | 1676 | 1.9 | 1445 | 1.8 | 92 | 2.8 | 49 | 4.7 | 73 | 3.7 |
| Testis | 1019 | 1.2 | 942 | 1.2 | 10 | 0.3 | 10 | 1.0 | 40 | 2.0 |
| Thyroid | 727 | 0.8 | 648 | 0.8 | 17 | 0.5 | 24 | 2.3 | 19 | 1.0 |
| Urinary Bladder | 6539 | 7.5 | 6267 | 7.9 | 93 | 2.8 | 31 | 3.0 | 84 | 4.2 |
| Other Sites | 5926 | 6.8 | 5350 | 6.7 | 221 | 6.7 | 82 | 7.9 | 161 | 8.1 |

¹ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

² The number of cases for all races is not the sum of cases by race/ethnicity. ³ Incidence rates for breast *in situ* are not presented.

Table 12.
INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 1999-2003
FEMALES

| Cancer Site/Type | All Races ² | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|------------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|----------|------------|
| | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases |
| All Sites | 85808 | 100.0 | 78668 | 100.0 | 2622 | 100.0 | 1096 | 100.0 | 1914 | 100.0 |
| Brain & Other Nervous System | 1146 | 1.3 | 1054 | 1.3 | 24 | 0.9 | 12 | 1.1 | 39 | 2.0 |
| Breast ³ | 25478 | 29.7 | 23477 | 29.8 | 774 | 29.5 | 296 | 27.0 | 525 | 27.4 |
| Bronchus & Lung | 11697 | 13.6 | 10996 | 14.0 | 338 | 12.9 | 113 | 10.3 | 130 | 6.8 |
| Cervix Uteri | 1145 | 1.3 | 890 | 1.1 | 84 | 3.2 | 33 | 3.0 | 100 | 5.2 |
| Colon / Rectum | 10187 | 11.9 | 9446 | 12.0 | 324 | 12.4 | 124 | 11.3 | 178 | 9.3 |
| Corpus Uteri & Uterus, NOS | 5142 | 6.0 | 4693 | 6.0 | 134 | 5.1 | 63 | 5.7 | 141 | 7.4 |
| Esophagus | 489 | 0.6 | 431 | 0.5 | 30 | 1.1 | 3 | 0.3 | 17 | 0.9 |
| Hodgkin Lymphoma | 498 | 0.6 | 439 | 0.6 | 20 | 0.8 | 9 | 0.8 | 27 | 1.4 |
| Kidney & Renal Pelvis | 1805 | 2.1 | 1673 | 2.1 | 69 | 2.6 | 10 | 0.0 | 31 | 1.6 |
| Larynx | 322 | 0.4 | 288 | 0.4 | 16 | 0.6 | 0 | 0.9 | 10 | 0.5 |
| Leukemia | 1810 | 2.1 | 1652 | 2.1 | 52 | 2.0 | 21 | 1.9 | 59 | 3.1 |
| Liver & Intrahepatic Bile Ducts | 498 | 0.6 | 407 | 0.5 | 29 | 1.1 | 27 | 2.5 | 31 | 1.6 |
| Melanoma of Skin | 3007 | 3.5 | 2760 | 3.5 | 7 | 0.3 | 10 | 0.9 | 26 | 1.4 |
| Multiple Myeloma | 806 | 0.9 | 714 | 0.9 | 54 | 2.1 | 9 | 0.8 | 19 | 1.0 |
| Non-Hodgkin Lymphoma | 3228 | 3.8 | 2934 | 3.7 | 96 | 3.7 | 45 | 4.1 | 98 | 5.1 |
| Oral Cavity & Pharynx | 1279 | 1.5 | 1131 | 1.4 | 48 | 1.8 | 40 | 3.6 | 30 | 1.6 |
| Ovary | 2708 | 3.2 | 2514 | 3.2 | 45 | 1.7 | 39 | 3.6 | 48 | 2.5 |
| Pancreas | 2148 | 2.5 | 1998 | 2.5 | 68 | 2.6 | 22 | 2.0 | 33 | 1.7 |
| Stomach | 1078 | 1.3 | 918 | 1.2 | 55 | 2.1 | 39 | 3.6 | 54 | 2.8 |
| Thyroid | 2435 | 2.8 | 2076 | 2.6 | 85 | 3.2 | 97 | 8.9 | 97 | 5.1 |
| Urinary Bladder | 2476 | 2.9 | 2367 | 3.0 | 42 | 1.6 | 12 | 1.1 | 28 | 1.5 |
| Other Sites | 6426 | 7.5 | 5810 | 7.4 | 228 | 8.7 | 72 | 6.6 | 193 | 10.1 |

¹ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

² The number of cases for all races is not the sum of cases by race/ethnicity. ³ Breast *in situ* cases are excluded from all sites and from breast cancer type.

Table 13.
INCIDENCE CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 1999-2003
TOTAL²

| | All Races ³ | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|------------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|----------|------------|
| Cancer Site/Type | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases |
| All Sites | 173430 | 100.0 | 158335 | 100.0 | 5915 | 100.0 | 2140 | 100.0 | 3901 | 100.0 |
| Brain & Other Nervous System | 2418 | 1.4 | 2200 | 1.4 | 54 | 0.9 | 36 | 1.7 | 90 | 2.3 |
| Breast ⁴ | 25696 | 14.8 | 23672 | 15.0 | 785 | 13.3 | 299 | 14.0 | 528 | 13.5 |
| Bronchus & Lung | 24122 | 13.9 | 22587 | 14.3 | 758 | 12.8 | 254 | 11.9 | 307 | 7.9 |
| Cervix Uteri | 1145 | 0.7 | 890 | 0.6 | 84 | 1.4 | 33 | 1.5 | 100 | 2.6 |
| Colon / Rectum | 20132 | 11.6 | 18646 | 11.8 | 610 | 10.3 | 267 | 12.5 | 367 | 9.4 |
| Corpus Uteri & Uterus, NOS | 5145 | 3.0 | 4694 | 3.0 | 134 | 2.3 | 64 | 3.0 | 142 | 3.6 |
| Esophagus | 2113 | 1.2 | 1925 | 1.2 | 91 | 1.5 | 16 | 0.7 | 59 | 1.5 |
| Hodgkin Lymphoma | 1067 | 0.6 | 952 | 0.6 | 34 | 0.6 | 13 | 0.6 | 51 | 1.3 |
| Kidney & Renal Pelvis | 4516 | 2.6 | 4150 | 2.6 | 162 | 2.7 | 32 | 1.5 | 100 | 2.6 |
| Larynx | 1456 | 0.8 | 1303 | 0.8 | 72 | 1.2 | 8 | 0.4 | 46 | 1.2 |
| Leukemia | 3888 | 2.2 | 3559 | 2.2 | 106 | 1.8 | 41 | 1.9 | 117 | 3.0 |
| Liver & Intrahepatic Bile Ducts | 1759 | 1.0 | 1386 | 0.9 | 102 | 1.7 | 140 | 6.5 | 106 | 2.7 |
| Melanoma of Skin | 6570 | 3.8 | 6080 | 3.8 | 12 | 0.2 | 16 | 0.7 | 43 | 1.1 |
| Multiple Myeloma | 1758 | 1.0 | 1570 | 1.0 | 117 | 2.0 | 14 | 0.7 | 37 | 0.9 |
| Non-Hodgkin Lymphoma | 6643 | 3.8 | 5989 | 3.8 | 219 | 3.7 | 106 | 5.0 | 216 | 5.5 |
| Oral Cavity & Pharynx | 3765 | 2.2 | 3334 | 2.1 | 149 | 2.5 | 90 | 4.2 | 120 | 3.1 |
| Ovary | 2710 | 1.6 | 2515 | 1.6 | 45 | 0.8 | 39 | 1.8 | 48 | 1.2 |
| Pancreas | 4022 | 2.3 | 3715 | 2.3 | 144 | 2.4 | 40 | 1.9 | 70 | 1.8 |
| Prostate | 26195 | 15.1 | 23338 | 14.7 | 1394 | 23.6 | 216 | 10.1 | 605 | 15.5 |
| Stomach | 2754 | 1.6 | 2363 | 1.5 | 147 | 2.5 | 88 | 4.1 | 127 | 3.3 |
| Testis | 1020 | 0.6 | 943 | 0.6 | 10 | 0.2 | 10 | 0.5 | 40 | 1.0 |
| Thyroid | 3163 | 1.8 | 2725 | 1.7 | 102 | 1.7 | 121 | 5.7 | 116 | 3.0 |
| Urinary Bladder | 9017 | 5.2 | 8636 | 5.5 | 135 | 2.3 | 43 | 2.0 | 112 | 2.9 |
| Other Sites | 12356 | 7.1 | 11163 | 7.1 | 449 | 7.6 | 154 | 7.2 | 354 | 9.1 |

¹ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category. ² Total includes persons classified as transsexual and persons of unknown sex. ³ The number of cases for all races is not the sum of cases by race/ethnicity. ⁴ Breast *in situ* cases are excluded from all sites and from breast cancer type.

Table 14.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 1999-2003
MALES

| | All Races | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|-----------|-------------|---------------------|-------------|---------------------|-------------|---------------------|-------------|----------|-------------|
| Cancer Site/Type | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL |
| All Sites | 623.1 | 618.9-627.2 | 616.4 | 612.1-620.7 | 708.7 | 683.0-734.3 | 350.7 | 326.9-374.4 | 534.8 | 507.6-562.0 |
| Brain & Other Nervous System | 8.7 | 8.2-9.2 | 8.8 | 8.3-9.4 | 4.5 | 2.7-6.4 | 5.8 | 3.3-8.4 | 7.5 | 4.9-10.1 |
| Breast ⁴ | 1.5 | 1.3-1.7 | 1.5 | 1.3-1.7 | * | * | * | * | * | * |
| Bronchus & Lung | 89.1 | 87.5-90.6 | 89.7 | 88.0-91.3 | 94.2 | 84.7-103.7 | 53.9 | 44.2-63.6 | 54.2 | 45.1-63.2 |
| Colon / Rectum | 72.2 | 70.7-73.6 | 72.1 | 70.6-73.6 | 62.3 | 54.6-70.0 | 50.9 | 41.6-60.2 | 52.3 | 43.6-60.9 |
| Esophagus | 11.6 | 11.0-12.1 | 11.5 | 11.0-12.1 | 13.8 | 10.1-17.5 | * | * | 12.7 | 8.3-17.1 |
| Hodgkin Lymphoma | 3.7 | 3.4-4.0 | 3.9 | 3.6-4.3 | * | * | * | * | 2.7 | 1.5-3.9 |
| Kidney & Renal Pelvis | 18.9 | 18.2-19.7 | 18.9 | 18.2-19.7 | 16.9 | 13.3-20.5 | 6.3 | 3.5-9.2 | 18.5 | 13.5-23.6 |
| Larynx | 8.0 | 7.5-8.5 | 7.8 | 7.3-8.2 | 13.0 | 9.3-16.6 | * | * | 9.9 | 6.1-13.6 |
| Leukemia | 14.8 | 14.1-15.4 | 15.0 | 14.3-15.6 | 10.3 | 7.3-13.4 | 4.6 | 2.2-7.1 | 11.2 | 7.4-14.9 |
| Liver & Intrahepatic Bile Ducts | 8.8 | 8.3-9.3 | 7.5 | 7.0-8.0 | 14.2 | 10.7-17.7 | 30.1 | 24.1-36.0 | 17.4 | 12.8-21.9 |
| Melanoma of Skin | 24.7 | 23.9-25.6 | 25.4 | 24.5-26.3 | * | * | * | * | * | * |
| Multiple Myeloma | 6.9 | 6.4-7.3 | 6.7 | 6.2-7.2 | 14.1 | 10.4-17.8 | * | * | * | * |
| Non-Hodgkin Lymphoma | 24.0 | 23.2-24.9 | 23.7 | 22.8-24.5 | 21.6 | 17.5-25.7 | 18.5 | 13.1-23.9 | 23.3 | 18.2-28.3 |
| Oral Cavity & Pharynx | 17.2 | 16.5-17.9 | 16.7 | 16.0-17.4 | 19.9 | 15.9-24.0 | 14.2 | 9.6-18.8 | 22.8 | 17.4-28.2 |
| Pancreas | 13.6 | 13.0-14.2 | 13.4 | 12.8-14.1 | 16.9 | 12.8-20.9 | * | * | 11.0 | 6.9-15.1 |
| Prostate | 185.1 | 182.8-187.3 | 178.5 | 176.2-180.8 | 308.1 | 291.2-325.0 | 82.9 | 71.0-94.7 | 187.8 | 171.5-204.1 |
| Stomach | 12.3 | 11.7-12.9 | 11.5 | 10.9-12.1 | 22.4 | 17.5-27.3 | 16.5 | 11.3-21.6 | 21.2 | 15.6-26.8 |
| Testis | 6.3 | 6.0-6.7 | 7.1 | 6.6-7.5 | * | * | * | * | 3.3 | 2.2-4.4 |
| Thyroid | 4.8 | 4.4-5.1 | 4.8 | 4.5-5.2 | * | * | 5.9 | 3.1-8.6 | * | * |
| Urinary Bladder | 48.0 | 46.8-49.1 | 49.5 | 48.2-50.7 | 23.4 | 18.4-28.5 | 11.6 | 7.1-16.0 | 28.2 | 21.5-34.9 |

¹ age-adjusted to the 2000 U.S. Standard Population ² per 100,000

³ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

⁴ Incidence rates for breast *in situ* are not presented because there are less than 20 cases.

* age-adjusted incidence rate not calculated when the numbers of cases are less than 20.

Table 15.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 1999-2003
FEMALES

| Cancer Site/Type | All Races | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|--|-----------|-------------|---------------------|-------------|---------------------|-------------|---------------------|-------------|----------|-------------|
| | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL |
| All Sites (Excluding Breast <i>in situ</i>) | 460.6 | 457.4-463.7 | 462.2 | 458.9-465.5 | 396.6 | 381.2-412.0 | 281.5 | 263.7-299.4 | 352.9 | 335.3-370.5 |
| Brain & Other Nervous System | 6.5 | 6.1-6.8 | 6.7 | 6.3-7.1 | 3.0 | 1.8-4.2 | * | * | 4.6 | 2.9-6.2 |
| Breast | 141.3 | 139.6-143.1 | 143.5 | 141.7-145.4 | 112.8 | 104.7-120.8 | 68.9 | 60.6-77.1 | 92.9 | 84.2-101.7 |
| Breast <i>in situ</i>⁴ | 49.0 | 47.9-50.0 | 49.4 | 48.3-50.5 | 33.0 | 28.6-37.4 | 31.4 | 26.0-36.8 | 33.3 | 28.5-38.2 |
| Bronchus & Lung | 62.0 | 60.8-63.1 | 63.1 | 61.9-64.3 | 54.0 | 48.2-59.9 | 36.0 | 29.1-43.0 | 29.2 | 23.8-34.6 |
| Cervix Uteri | 6.6 | 6.2-7.0 | 5.8 | 5.4-6.2 | 11.3 | 8.9-13.8 | 8.0 | 5.2-10.9 | 14.7 | 11.5-18.0 |
| Colon / Rectum | 50.9 | 49.9-51.9 | 50.6 | 49.5-51.6 | 52.8 | 47.0-58.6 | 37.9 | 30.9-45.0 | 38.3 | 32.2-44.4 |
| Corpus Uteri & Uterus, NOS | 28.7 | 27.9-29.5 | 28.8 | 28.0-29.7 | 20.5 | 17.0-24.0 | 15.4 | 11.4-19.3 | 25.7 | 21.1-30.3 |
| Esophagus | 2.5 | 2.3-2.7 | 2.3 | 2.1-2.6 | 4.7 | 3.0-6.4 | * | * | * | * |
| Hodgkin Lymphoma | 2.9 | 2.7-3.2 | 3.1 | 2.8-3.4 | 2.3 | 1.3-3.3 | * | * | 3.0 | 1.6-4.4 |
| Kidney & Renal Pelvis | 9.7 | 9.3-10.2 | 9.8 | 9.4-10.3 | 9.8 | 7.5-12.2 | * | * | 5.9 | 3.7-8.1 |
| Larynx | 1.8 | 1.6-2.0 | 1.7 | 1.5-2.0 | * | * | * | * | * | * |
| Leukemia | 9.6 | 9.1-10.0 | 9.7 | 9.2-10.1 | 7.3 | 5.2-9.3 | 4.8 | 2.5-7.1 | 8.7 | 6.0-11.4 |
| Liver & Intrahepatic Bile Ducts | 2.6 | 2.3-2.8 | 2.2 | 2.0-2.5 | 4.7 | 3.0-6.5 | 8.7 | 5.3-12.2 | 8.2 | 5.1-11.2 |
| Melanoma of Skin | 16.8 | 16.2-17.4 | 17.4 | 16.8-18.1 | * | * | * | * | 3.8 | 2.1-5.4 |
| Multiple Myeloma | 4.1 | 3.8-4.4 | 3.9 | 3.6-4.2 | 9.0 | 6.6-11.4 | * | * | * | * |
| Non-Hodgkin Lymphoma | 17.0 | 16.4-17.6 | 16.8 | 16.2-17.4 | 14.2 | 11.3-17.1 | 10.9 | 7.4-14.5 | 17.7 | 13.7-21.6 |
| Oral Cavity & Pharynx | 6.9 | 6.5-7.3 | 6.7 | 6.3-7.1 | 7.0 | 5.0-9.0 | 9.8 | 6.5-13.1 | 5.8 | 3.5-8.1 |
| Ovary | 14.8 | 14.2-15.4 | 15.1 | 14.5-15.8 | 6.7 | 4.7-8.7 | 8.4 | 5.5-11.3 | 8.9 | 6.2-11.7 |
| Pancreas | 10.7 | 10.3-11.2 | 10.7 | 10.2-11.2 | 11.3 | 8.6-14.0 | 7.4 | 4.2-10.6 | 7.3 | 4.6-10.1 |
| Stomach | 5.3 | 4.9-5.6 | 4.7 | 4.4-5.0 | 8.9 | 6.5-11.2 | 10.9 | 7.2-14.6 | 11.7 | 8.3-15.1 |
| Thyroid | 14.3 | 13.7-14.9 | 14.2 | 13.5-14.8 | 10.6 | 8.3-12.9 | 18.5 | 14.5-22.5 | 12.2 | 9.5-14.9 |
| Urinary Bladder | 12.6 | 12.1-13.1 | 13.1 | 12.5-13.6 | 7.1 | 4.9-9.3 | * | * | 6.8 | 4.2-9.5 |

¹ Age-adjusted to the 2000 U.S. Standard Population ² per 100,000

³ Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

⁴ Breast *in situ* is excluded from all sites

* Age-adjusted incidence rate not calculated when there are less than 20 cases.

Table 16.
AGE-ADJUSTED¹ INCIDENCE RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 1999-2003
TOTAL

| Cancer Site/Type | All Races | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|--|----------------|-------------|---------------------|-------------|---------------------|-------------|---------------------|-------------|----------|-------------|
| | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL |
| All Sites (Excluding Breast <i>in situ</i>) | 524.3 | 521.8-526.8 | 522.1 | 519.5-524.7 | 522.4 | 508.7-536.1 | 310.4 | 296.1-324.8 | 427.0 | 411.8-442.2 |
| Brain & Other Nervous System | 7.4 | 7.1-7.7 | 7.6 | 7.3-8.0 | 3.6 | 2.6-4.6 | 4.0 | 2.6-5.4 | 5.9 | 4.4-7.3 |
| Breast | 78.2 | 77.3-79.2 | 79.3 | 78.2-80.3 | 64.5 | 59.8-69.1 | 36.7 | 32.2-41.2 | 52.5 | 47.4-57.5 |
| Breast <i>in situ</i>⁴ | 26.3 | 25.7-26.8 | 26.5 | 25.9-27.1 | 18.7 | 16.2-21.2 | 16.4 | 13.5-19.3 | 18.3 | 15.6-21.0 |
| Bronchus & Lung | 72.8 | 71.8-73.7 | 73.6 | 72.7-74.6 | 70.3 | 65.2-75.4 | 44.0 | 38.3-49.8 | 39.5 | 34.7-44.3 |
| Cervix Uteri | - ⁵ | - | - | - | - | - | - | - | - | - |
| Colon / Rectum | 59.8 | 59.0-60.6 | 59.6 | 58.7-60.4 | 57.2 | 52.6-61.9 | 43.8 | 38.2-49.4 | 44.3 | 39.3-49.4 |
| Corpus Uteri & Uterus, NOS | - | - | - | - | - | - | - | - | - | - |
| Esophagus | 6.4 | 6.1-6.7 | 6.3 | 6.0-6.6 | 8.4 | 6.6-10.1 | * | * | 8.2 | 5.9-10.5 |
| Hodgkin Lymphoma | 3.3 | 3.1-3.5 | 3.5 | 3.3-3.7 | 2.1 | 1.4-2.8 | * | * | 2.9 | 1.9-3.9 |
| Kidney & Renal Pelvis | 13.7 | 13.3-14.2 | 13.8 | 13.4-14.2 | 12.9 | 10.8-14.9 | 4.5 | 2.8-6.1 | 11.2 | 8.8-13.7 |
| Larynx | 4.5 | 4.2-4.7 | 4.3 | 4.1-4.6 | 6.6 | 5.1-8.2 | * | * | 4.9 | 3.3-6.5 |
| Leukemia | 11.8 | 11.4-12.1 | 11.9 | 11.5-12.3 | 8.4 | 6.7-10.0 | 4.7 | 3.1-6.4 | 9.8 | 7.6-11.9 |
| Liver & Intrahepatic Bile Ducts | 5.3 | 5.1-5.6 | 4.6 | 4.3-4.8 | 9.0 | 7.2-10.7 | 19.1 | 15.7-22.5 | 12.4 | 9.8-15.1 |
| Melanoma of Skin | 19.9 | 19.5-20.4 | 20.6 | 20.0-21.1 | * | * | * | * | 4.0 | 2.6-5.4 |
| Multiple Myeloma | 5.3 | 5.0-5.5 | 5.1 | 4.8-5.3 | 11.2 | 9.1-13.3 | * | * | 4.9 | 3.2-6.6 |
| Non-Hodgkin Lymphoma | 20.0 | 19.5-20.5 | 19.7 | 19.2-20.2 | 17.6 | 15.2-20.0 | 14.3 | 11.3-17.3 | 20.3 | 17.1-23.4 |
| Oral Cavity & Pharynx | 11.5 | 11.1-11.9 | 11.2 | 10.8-11.6 | 12.5 | 10.5-14.6 | 11.8 | 9.1-14.5 | 13.1 | 10.5-15.7 |
| Ovary | - | - | - | - | - | - | - | - | - | - |
| Pancreas | 12.0 | 11.6-12.3 | 11.9 | 11.5-12.3 | 13.7 | 11.4-16.0 | 6.7 | 4.5-8.9 | 8.9 | 6.5-11.2 |
| Prostate | - | - | - | - | - | - | - | - | - | - |
| Stomach | 8.1 | 7.8-8.5 | 7.5 | 7.2-7.8 | 14.1 | 11.7-16.4 | 13.4 | 10.4-16.4 | 15.7 | 12.6-18.8 |
| Testis | - | - | - | - | - | - | - | - | - | - |
| Thyroid | 9.7 | 9.4-10.0 | 9.6 | 9.3-10.0 | 6.9 | 5.6-8.3 | 12.4 | 9.9-14.9 | 8.0 | 6.4-9.7 |
| Urinary Bladder | 26.9 | 26.3-27.5 | 27.8 | 27.2-28.3 | 13.5 | 11.2-15.8 | 7.4 | 5.1-9.8 | 15.6 | 12.5-18.7 |

¹Age-adjusted to the 2000 U.S. Standard Population. ²per 100,000 ³Race/ethnicity categories are mutually exclusive. Cases are only included in one race/ethnicity category.

⁴Breast *in situ* is excluded from all sites. ⁵Dashed out cancers are found in only one sex. * Age-adjusted incidence rate not calculated when there are less than 20 cases.

Table 17.
FIVE LEADING CANCER MORTALITY RATES BY RACE/ETHNICITY AND SEX

Massachusetts, 1999-2003

MALES

| AGE-ADJUSTED¹ MORTALITY RATE² | | | | |
|--|----------------------------|----------------------------|--|--|
| RANK | White, non-Hispanic | Black, non-Hispanic | Asian, non-Hispanic | Hispanic |
| 1 | Bronchus & Lung 72.4 | Bronchus & Lung 92.1 | Bronchus & Lung 48.2 | Bronchus & Lung 33.4 |
| 2 | Prostate 30.3 | Prostate 62.9 | Liver & Intrahepatic Bile Ducts 20.1 | Prostate 20.9 |
| 3 | Colon / Rectum 27.1 | Colon / Rectum 32.8 | Colon / Rectum 10.7 | Colon / Rectum 13.6 |
| 4 | Pancreas 13.3 | Pancreas 19.4 | * | Liver & Intrahepatic Bile Ducts 10.0 |
| 5 | Esophagus 10.3 | Stomach 15.7 | * | Stomach 9.6 |

FEMALES

| AGE-ADJUSTED¹ MORTALITY RATE² | | | | |
|--|----------------------------|--------------------------------------|---|-------------------------|
| RANK | White, non-Hispanic | Black, non-Hispanic | Asian, non-Hispanic | Hispanic |
| 1 | Bronchus & Lung 45.9 | Bronchus & Lung 40.4 | Bronchus & Lung 24.2 | Breast 15.2 |
| 2 | Breast 27.0 | Breast 32.0 | Colon / Rectum 13.4 | Bronchus & Lung 14.4 |
| 3 | Colon / Rectum 17.9 | Colon / Rectum 24.5 | Breast 11.1 | Colon / Rectum 12.7 |
| 4 | Pancreas 10.1 | Pancreas 12.9 | Liver & Intrahepatic Bile Ducts 8.3 | Pancreas 7.1 |
| 5 | Ovary 9.5 | Corpus Uteri & Uterus, NOS 8.8 | Stomach 7.0 | Ovary 5.2 |

¹ Age-adjusted to the 2000 U.S. Standard Population ² per 100,000

* No other reported cancer with greater than 20 cases for the ranking

Table 18.
MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 1999-2003
MALES

| Cancer Site/Type | All Races ² | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|------------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|----------|------------|
| | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases |
| All Sites | 34350 | 100.0 | 32012 | 100.0 | 1405 | 100.0 | 403 | 100.0 | 502 | 100.0 |
| Brain & Other Nervous System | 805 | 2.3 | 755 | 2.4 | 19 | 1.4 | 13 | 3.2 | 17 | 3.4 |
| Breast | 33 | 0.1 | 31 | 0.1 | 1 | 0.1 | 1 | 0.2 | 0 | 0.0 |
| Bronchus & Lung | 9862 | 28.7 | 9237 | 28.9 | 394 | 28.0 | 119 | 29.5 | 109 | 21.7 |
| Colon / Rectum | 3552 | 10.3 | 3351 | 10.5 | 131 | 9.3 | 29 | 7.2 | 37 | 7.4 |
| Esophagus | 1406 | 4.1 | 1313 | 4.1 | 58 | 4.1 | 8 | 2.0 | 25 | 5.0 |
| Hodgkin Lymphoma | 98 | 0.3 | 83 | 0.3 | 9 | 0.6 | 0 | 0.0 | 6 | 1.2 |
| Kidney & Renal Pelvis | 817 | 2.4 | 779 | 2.4 | 22 | 1.6 | 7 | 1.7 | 8 | 1.6 |
| Larynx | 382 | 1.1 | 350 | 1.1 | 21 | 1.5 | 1 | 0.2 | 9 | 1.8 |
| Leukemia | 1306 | 3.8 | 1231 | 3.8 | 38 | 2.7 | 13 | 3.2 | 23 | 4.6 |
| Liver & Intrahepatic Bile Ducts | 1033 | 3.0 | 859 | 2.7 | 60 | 4.3 | 73 | 18.1 | 41 | 8.2 |
| Melanoma of Skin | 614 | 1.8 | 602 | 1.9 | 3 | 0.2 | 2 | 0.5 | 7 | 1.4 |
| Multiple Myeloma | 609 | 1.8 | 563 | 1.8 | 35 | 2.5 | 0 | 0.0 | 10 | 2.0 |
| Non-Hodgkin Lymphoma | 1337 | 3.9 | 1268 | 4.0 | 32 | 2.3 | 16 | 4.0 | 18 | 3.6 |
| Oral Cavity & Pharynx | 594 | 1.7 | 531 | 1.7 | 28 | 2.0 | 18 | 4.5 | 16 | 3.2 |
| Pancreas | 1824 | 5.3 | 1690 | 5.3 | 86 | 6.1 | 16 | 4.0 | 28 | 5.6 |
| Prostate | 3746 | 10.9 | 3486 | 10.9 | 199 | 14.2 | 15 | 3.7 | 44 | 8.8 |
| Stomach | 965 | 2.8 | 853 | 2.7 | 65 | 4.6 | 18 | 4.5 | 28 | 5.6 |
| Testis | 43 | 0.1 | 40 | 0.1 | 1 | 0.1 | 1 | 0.2 | 1 | 0.2 |
| Thyroid | 58 | 0.2 | 52 | 0.2 | 6 | 0.4 | 0 | 0.0 | 0 | 0.0 |
| Urinary Bladder | 1166 | 3.4 | 1123 | 3.5 | 31 | 2.2 | 6 | 1.5 | 5 | 1.0 |
| Other Sites | 4100 | 11.9 | 3815 | 11.9 | 166 | 11.8 | 47 | 11.7 | 70 | 13.9 |

¹ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

² The number of cases for all races is not the sum of cases by race/ethnicity.

Table 19.
MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 1999-2003
FEMALES

| Cancer Site / Type | All Races ² | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|------------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|----------|------------|
| | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases |
| All Sites | 34676 | 100.0 | 32600 | 100.0 | 1237 | 100.0 | 355 | 100.0 | 453 | 100.0 |
| Brain & Other Nervous System | 655 | 1.9 | 624 | 1.9 | 16 | 1.3 | 8 | 2.3 | 7 | 1.5 |
| Breast | 5200 | 15.0 | 4865 | 14.9 | 209 | 16.9 | 41 | 11.5 | 79 | 17.4 |
| Bronchus & Lung | 8684 | 25.0 | 8306 | 25.5 | 244 | 19.7 | 73 | 20.6 | 55 | 12.1 |
| Cervix Uteri | 300 | 0.9 | 254 | 0.8 | 23 | 1.9 | 13 | 3.7 | 10 | 2.2 |
| Colon / Rectum | 3821 | 11.0 | 3587 | 11.0 | 144 | 11.6 | 38 | 10.7 | 49 | 10.8 |
| Corpus Uteri & Uterus, NOS | 867 | 2.5 | 789 | 2.4 | 54 | 4.4 | 8 | 2.3 | 13 | 2.9 |
| Esophagus | 394 | 1.1 | 367 | 1.1 | 18 | 1.5 | 1 | 0.3 | 8 | 1.8 |
| Hodgkin Lymphoma | 85 | 0.2 | 83 | 0.3 | 1 | 0.1 | 0 | 0.0 | 1 | 0.2 |
| Kidney & Renal Pelvis | 517 | 1.5 | 495 | 1.5 | 13 | 1.1 | 5 | 1.4 | 4 | 0.9 |
| Larynx | 110 | 0.3 | 98 | 0.3 | 10 | 0.8 | 1 | 0.3 | 1 | 0.2 |
| Leukemia | 1176 | 3.4 | 1104 | 3.4 | 37 | 3.0 | 14 | 3.9 | 21 | 4.6 |
| Liver & Intrahepatic Bile Ducts | 504 | 1.5 | 434 | 1.3 | 25 | 2.0 | 25 | 7.0 | 20 | 4.4 |
| Melanoma of Skin | 388 | 1.1 | 385 | 1.2 | 1 | 0.1 | 0 | 0.0 | 1 | 0.2 |
| Multiple Myeloma | 641 | 1.8 | 585 | 1.8 | 40 | 3.2 | 2 | 0.6 | 14 | 3.1 |
| Non-Hodgkin Lymphoma | 1412 | 4.1 | 1331 | 4.1 | 44 | 3.6 | 15 | 4.2 | 21 | 4.6 |
| Oral Cavity & Pharynx | 335 | 1.0 | 313 | 1.0 | 8 | 0.6 | 7 | 2.0 | 4 | 0.9 |
| Ovary | 1766 | 5.1 | 1691 | 5.2 | 37 | 3.0 | 13 | 3.7 | 24 | 5.3 |
| Pancreas | 2079 | 6.0 | 1949 | 6.0 | 77 | 6.2 | 21 | 5.9 | 29 | 6.4 |
| Stomach | 735 | 2.1 | 650 | 2.0 | 41 | 3.3 | 23 | 6.5 | 21 | 4.6 |
| Thyroid | 101 | 0.3 | 93 | 0.3 | 2 | 0.2 | 5 | 1.4 | 1 | 0.2 |
| Urinary Bladder | 611 | 1.8 | 580 | 1.8 | 20 | 1.6 | 1 | 0.3 | 9 | 2.0 |
| Other Sites | 4295 | 12.4 | 4017 | 12.3 | 173 | 14.0 | 41 | 11.5 | 61 | 13.5 |

¹ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. ² The number of cases for all races is not the sum of cases by race/ethnicity.

Table 20.
MORTALITY CASES AND PERCENTAGE OF CASES FOR SELECTED CANCER SITES BY RACE/ETHNICITY¹
Massachusetts, 1999-2003
TOTAL

| Cancer Site/Type | All Races ² | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|------------------------|------------|---------------------|------------|---------------------|------------|---------------------|------------|----------|------------|
| | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases | Cases | % of Cases |
| All Sites | 69026 | 100.0 | 64612 | 100.0 | 2642 | 100.0 | 758 | 100.0 | 955 | 100.0 |
| Brain & Other Nervous System | 1460 | 2.1 | 1379 | 2.1 | 35 | 1.3 | 21 | 2.8 | 24 | 2.5 |
| Breast | 5233 | 7.6 | 4896 | 7.6 | 210 | 7.9 | 42 | 5.5 | 79 | 8.3 |
| Bronchus & Lung | 18546 | 26.9 | 17543 | 27.2 | 638 | 24.1 | 192 | 25.3 | 164 | 17.2 |
| Cervix Uteri | 300 | 0.4 | 254 | 0.4 | 23 | 0.9 | 13 | 1.7 | 10 | 1.0 |
| Colon / Rectum | 7373 | 10.7 | 6938 | 10.7 | 275 | 10.4 | 67 | 8.8 | 86 | 9.0 |
| Corpus Uteri & Uterus, NOS | 867 | 1.3 | 789 | 1.2 | 54 | 2.0 | 8 | 1.1 | 13 | 1.4 |
| Esophagus | 1800 | 2.6 | 1680 | 2.6 | 76 | 2.9 | 9 | 1.2 | 33 | 3.5 |
| Hodgkin Lymphoma | 183 | 0.3 | 166 | 0.3 | 10 | 0.4 | 0 | 0.0 | 7 | 0.7 |
| Kidney & Renal Pelvis | 1334 | 1.9 | 1274 | 2.0 | 35 | 1.3 | 12 | 1.6 | 12 | 1.3 |
| Larynx | 492 | 0.7 | 448 | 0.7 | 31 | 1.2 | 2 | 0.3 | 10 | 1.0 |
| Leukemia | 2482 | 3.6 | 2335 | 3.6 | 75 | 2.8 | 27 | 3.6 | 44 | 4.6 |
| Liver & Intrahepatic Bile Ducts | 1537 | 2.2 | 1293 | 2.0 | 85 | 3.2 | 98 | 12.9 | 61 | 6.4 |
| Melanoma of Skin | 1002 | 1.5 | 987 | 1.5 | 4 | 0.2 | 2 | 0.3 | 8 | 0.8 |
| Multiple Myeloma | 1250 | 1.8 | 1148 | 1.8 | 75 | 2.8 | 2 | 0.3 | 24 | 2.5 |
| Non-Hodgkin Lymphoma | 2749 | 4.0 | 2599 | 4.0 | 76 | 2.9 | 31 | 4.1 | 39 | 4.1 |
| Oral Cavity & Pharynx | 929 | 1.3 | 844 | 1.3 | 36 | 1.4 | 25 | 3.3 | 20 | 2.1 |
| Ovary | 1766 | 2.6 | 1691 | 2.6 | 37 | 1.4 | 13 | 1.7 | 24 | 2.5 |
| Pancreas | 3903 | 5.7 | 3639 | 5.6 | 163 | 6.2 | 37 | 4.9 | 57 | 6.0 |
| Prostate | 3746 | 5.4 | 3486 | 5.4 | 199 | 7.5 | 15 | 2.0 | 44 | 4.6 |
| Stomach | 1700 | 2.5 | 1503 | 2.3 | 106 | 4.0 | 41 | 5.4 | 49 | 5.1 |
| Testis | 43 | 0.1 | 40 | 0.1 | 1 | 0.0 | 1 | 0.1 | 1 | 0.1 |
| Thyroid | 159 | 0.2 | 145 | 0.2 | 8 | 0.3 | 5 | 0.7 | 1 | 0.1 |
| Urinary Bladder | 1777 | 2.6 | 1703 | 2.6 | 51 | 1.9 | 7 | 0.9 | 14 | 1.5 |
| Other Sites | 8395 | 12.2 | 7832 | 12.1 | 339 | 12.8 | 88 | 11.6 | 131 | 13.7 |

¹ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. ² The number of cases for all races is not the sum of cases by race/ethnicity.

Table 21.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 1999-2003
MALES

| Cancer Site / Type | All Races | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|--|-----------|-------------|---------------------|-------------|---------------------|-------------|---------------------|-------------|----------|-------------|
| | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL |
| All Sites | 256.0 | 253.3–258.7 | 256.7 | 253.9–259.6 | 342.5 | 323.3–361.7 | 149.6 | 133.1–166.0 | 153.5 | 137.9–169.1 |
| Brain & Other Nervous System | 5.6 | 5.2–5.9 | 5.8 | 5.3–6.2 | * | * | * | * | * | * |
| Breast | 0.2 | 0.2–0.3 | 0.2 | 0.2–0.3 | * | * | * | * | * | * |
| Bronchus & Lung | 71.8 | 70.4–73.3 | 72.4 | 70.9–73.9 | 92.1 | 82.4–101.7 | 48.2 | 38.7–57.6 | 33.4 | 26.4–40.4 |
| Colon / Rectum | 26.8 | 25.9–27.7 | 27.1 | 26.2–28.0 | 32.8 | 26.7–38.8 | 10.7 | 6.3–15.2 | 13.6 | 8.6–18.7 |
| Esophagus | 10.2 | 9.6–10.7 | 10.3 | 9.7–10.8 | 13.7 | 9.9–17.4 | * | * | 7.6 | 4.3–11.0 |
| Hodgkin Lymphoma | 0.7 | 0.5–0.8 | 0.6 | 0.5–0.8 | * | * | * | * | * | * |
| Kidney & Renal Pelvis | 6.0 | 5.6–6.4 | 6.1 | 5.7–6.6 | 5.1 | 2.8–7.4 | * | * | * | * |
| Larynx | 2.8 | 2.5–3.1 | 2.7 | 2.5–3.0 | 5.0 | 2.8–7.3 | * | * | * | * |
| Leukemia | 9.7 | 9.2–10.2 | 9.9 | 9.3–10.5 | 8.5 | 5.6–11.3 | * | * | 4.4 | 2.0–6.7 |
| Liver & Intrahepatic Bile Ducts | 7.4 | 6.9–7.8 | 6.7 | 6.3–7.2 | 12.5 | 9.1–15.9 | 20.1 | 15.2–24.9 | 10.0 | 6.5–13.5 |
| Melanoma of Skin | 4.4 | 4.1–4.8 | 4.7 | 4.3–5.1 | * | * | * | * | * | * |
| Multiple Myeloma | 4.6 | 4.2–4.9 | 4.5 | 4.2–4.9 | 8.2 | 5.3–11.0 | * | * | * | * |
| Non-Hodgkin Lymphoma | 9.9 | 9.4–10.5 | 10.2 | 9.6–10.7 | 6.3 | 4.0–8.6 | * | * | * | * |
| Oral Cavity & Pharynx | 4.3 | 3.9–4.6 | 4.2 | 3.8–4.5 | 5.9 | 3.5–8.2 | * | * | * | * |
| Pancreas | 13.4 | 12.7–14.0 | 13.3 | 12.7–14.0 | 19.4 | 15.0–23.8 | * | * | 9.5 | 5.5–13.5 |
| Prostate | 30.7 | 29.7–31.7 | 30.3 | 29.3–31.3 | 62.9 | 53.8–72.0 | * | * | 20.9 | 14.4–27.5 |
| Stomach | 7.2 | 6.8–7.7 | 6.9 | 6.4–7.4 | 15.7 | 11.6–19.9 | * | * | 9.6 | 5.5–13.6 |
| Testis | 0.3 | 0.2–0.4 | 0.3 | 0.2–0.4 | * | * | * | * | * | * |
| Thyroid | 0.4 | 0.3–0.5 | 0.4 | 0.3–0.5 | * | * | * | * | * | * |
| Urinary Bladder | 9.1 | 8.6–9.7 | 9.4 | 8.8–9.9 | 9.0 | 5.6–12.3 | * | * | * | * |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000

³ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

*age-adjusted mortality rate not calculated when number of deaths was less than 20.

Table 22.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 1999-2003
FEMALES

| Cancer Site / Type | All Races | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|-----------|-------------|---------------------|-------------|---------------------|-------------|---------------------|------------|----------|------------|
| | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL |
| All Sites | 172.8 | 171.0–174.7 | 174.6 | 172.7–176.6 | 201.4 | 190.0–212.8 | 110.7 | 98.5–122.9 | 104.4 | 93.9–114.9 |
| Brain & Other Nervous System | 3.5 | 3.3–3.8 | 3.7 | 3.4–4.0 | * | * | * | * | * | * |
| Breast | 26.7 | 25.9–27.4 | 27.0 | 26.2–27.7 | 32.0 | 27.6–36.5 | 11.1 | 7.5–14.7 | 15.2 | 11.6–18.8 |
| Bronchus & Lung | 44.5 | 43.6–45.5 | 45.9 | 44.9–46.9 | 40.4 | 35.3–45.6 | 24.2 | 18.4–30.1 | 14.4 | 10.4–18.4 |
| Cervix Uteri | 1.7 | 1.5–1.8 | 1.5 | 1.3–1.7 | 3.3 | 1.9–4.7 | * | * | * | * |
| Colon / Rectum | 17.9 | 17.3–18.5 | 17.9 | 17.3–18.5 | 24.5 | 20.5–28.6 | 13.4 | 8.9–17.9 | 12.7 | 8.9–16.4 |
| Corpus Uteri & Uterus, NOS | 4.4 | 4.1–4.7 | 4.2 | 3.9–4.5 | 8.8 | 6.5–11.2 | * | * | * | * |
| Esophagus | 1.9 | 1.7–2.1 | 1.9 | 1.7–2.1 | * | * | * | * | * | * |
| Hodgkin Lymphoma | 0.5 | 0.4–0.6 | 0.5 | 0.4–0.6 | * | * | * | * | * | * |
| Kidney & Renal Pelvis | 2.6 | 2.3–2.8 | 2.6 | 2.4–2.9 | * | * | * | * | * | * |
| Larynx | 0.6 | 0.5–0.7 | 0.5 | 0.4–0.7 | * | * | * | * | * | * |
| Leukemia | 5.7 | 5.4–6.1 | 5.8 | 5.4–6.1 | 5.5 | 3.7–7.4 | * | * | 3.8 | 1.9–5.8 |
| Liver & Intrahepatic Bile Ducts | 2.5 | 2.2–2.7 | 2.2 | 2.0–2.5 | 4.2 | 2.6–5.9 | 8.3 | 4.9–11.8 | 5.1 | 2.7–7.5 |
| Melanoma of Skin | 2.0 | 1.8–2.2 | 2.2 | 2.0–2.4 | * | * | * | * | * | * |
| Multiple Myeloma | 3.1 | 2.9–3.4 | 3.0 | 2.8–3.3 | 7.0 | 4.8–9.1 | * | * | * | * |
| Non-Hodgkin Lymphoma | 6.8 | 6.4–7.2 | 6.8 | 6.5–7.2 | 7.0 | 4.9–9.1 | * | * | 4.4 | 2.3–6.5 |
| Oral Cavity & Pharynx | 1.7 | 1.5–1.9 | 1.7 | 1.5–1.9 | * | * | * | * | * | * |
| Ovary | 9.2 | 8.7–9.6 | 9.5 | 9.1–10.0 | 6.2 | 4.2–8.2 | * | * | 5.2 | 3.0–7.5 |
| Pancreas | 10.1 | 9.7–10.6 | 10.1 | 9.7–10.6 | 12.9 | 10.0–15.8 | 6.9 | 3.8–10.0 | 7.1 | 4.3–10.0 |
| Stomach | 3.5 | 3.2–3.7 | 3.2 | 3.0–3.5 | 6.9 | 4.8–9.0 | 7.0 | 3.9–10.0 | 4.8 | 2.5–7.1 |
| Thyroid | 0.5 | 0.4–0.6 | 0.5 | 0.4–0.6 | * | * | * | * | * | * |
| Urinary Bladder | 2.8 | 2.6–3.1 | 2.9 | 2.6–3.1 | 3.5 | 1.9–5.0 | * | * | * | * |

¹ age-adjusted to the 2000 U.S. Standard Population

² per 100,000

³ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category.

*age-adjusted mortality rate not calculated when number of deaths was less than 20.

Table 23.
AGE-ADJUSTED¹ MORTALITY RATES² AND 95% CONFIDENCE LIMITS (95% CL) FOR SELECTED CANCER SITES BY
RACE/ETHNICITY³
Massachusetts, 1999-2003
TOTAL

| Cancer Site / Type | All Races | | White, non-Hispanic | | Black, non-Hispanic | | Asian, non-Hispanic | | Hispanic | |
|---------------------------------|----------------|-------------|---------------------|-------------|---------------------|-------------|---------------------|-------------|----------|-------------|
| | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL | Rate | 95%CL |
| All Sites | 203.8 | 202.3–205.3 | 204.9 | 203.3–206.5 | 255.8 | 245.8–265.9 | 128.0 | 118.1–137.9 | 124.8 | 115.9–133.6 |
| Brain & Other Nervous System | 4.4 | 4.2–4.7 | 4.6 | 4.4–4.9 | 2.7 | 1.8–3.7 | 3.3 | 1.8–4.8 | 1.8 | 0.9–2.7 |
| Breast | 15.5 | 15.1–15.9 | 15.7 | 15.2–16.1 | 18.8 | 16.2–21.4 | 6.3 | 4.2–8.3 | 8.6 | 6.5–10.7 |
| Bronchus & Lung | 55.4 | 54.6–56.2 | 56.3 | 55.5–57.2 | 61.4 | 56.6–66.3 | 34.9 | 29.6–40.1 | 22.5 | 18.8–26.2 |
| Cervix Uteri | — ⁴ | — | — | — | — | — | — | — | — | — |
| Colon / Rectum | 21.5 | 21.0–22.0 | 21.6 | 21.1–22.1 | 28.0 | 24.6–31.3 | 12.5 | 9.3–15.8 | 13.0 | 10.0–15.9 |
| Corpus Uteri & Uterus, NOS | — | — | — | — | — | — | — | — | — | — |
| Esophagus | 5.4 | 5.1–5.6 | 5.4 | 5.2–5.7 | 7.2 | 5.6–8.9 | * | * | 4.7 | 2.9–6.4 |
| Hodgkin Lymphoma | 0.6 | 0.5–0.6 | 0.6 | 0.5–0.6 | * | * | * | * | * | * |
| Kidney & Renal Pelvis | 4.0 | 3.7–4.2 | 4.1 | 3.9–4.3 | 3.5 | 2.3–4.6 | * | * | * | * |
| Larynx | 1.5 | 1.3–1.6 | 1.4 | 1.3–1.6 | 3.1 | 2.0–4.2 | * | * | * | * |
| Leukemia | 7.3 | 7.0–7.6 | 7.4 | 7.1–7.7 | 6.7 | 5.1–8.3 | 3.8 | 2.2–5.4 | 4.2 | 2.6–5.7 |
| Liver & Intrahepatic Bile Ducts | 4.6 | 4.4–4.8 | 4.1 | 3.9–4.4 | 7.8 | 6.1–9.5 | 14.2 | 11.2–17.2 | 7.4 | 5.3–9.5 |
| Melanoma of Skin | 3.0 | 2.8–3.2 | 3.2 | 3.0–3.4 | * | * | * | * | * | * |
| Multiple Myeloma | 3.7 | 3.5–3.9 | 3.6 | 3.4–3.8 | 7.7 | 5.9–9.4 | * | * | 3.6 | 2.0–5.1 |
| Non-Hodgkin Lymphoma | 8.1 | 7.7–8.4 | 8.2 | 7.9–8.5 | 6.9 | 5.3–8.6 | 5.7 | 3.5–8.0 | 4.3 | 2.8–5.8 |
| Oral Cavity & Pharynx | 2.8 | 2.6–3.0 | 2.7 | 2.5–2.9 | 3.2 | 2.1–4.3 | 3.7 | 2.1–5.3 | 2.3 | 1.2–3.5 |
| Ovary | — | — | — | — | — | — | — | — | — | — |
| Pancreas | 11.5 | 11.2–11.9 | 11.5 | 11.1–11.9 | 15.6 | 13.2–18.1 | 6.5 | 4.2–8.7 | 8.2 | 5.8–10.5 |
| Prostate | — | — | — | — | — | — | — | — | — | — |
| Stomach | 5.0 | 4.7–5.2 | 4.7 | 4.4–4.9 | 10.4 | 8.4–12.5 | 6.7 | 4.5–9.0 | 6.7 | 4.6–8.8 |
| Testis | — | — | — | — | — | — | — | — | — | — |
| Thyroid | 0.5 | 0.4–0.5 | 0.5 | 0.4–0.5 | * | * | * | * | * | * |
| Urinary Bladder | 5.1 | 4.9–5.4 | 5.2 | 5.0–5.5 | 5.5 | 4.0–7.1 | * | * | * | * |

¹ age-adjusted to the 2000 U.S. Standard Population. ² per 100,000

³ Race/ethnicity categories are mutually exclusive. Deaths are only included in one race/ethnicity category. ⁴ Dashed out cancers are found in only one sex

*age-adjusted mortality rate not calculated when number of deaths was less than 20.

Table 24.
INCIDENCE AND MORTALITY RATES¹ FOR SELECTED CANCER SITES BY SEX
Massachusetts Residents, 1999-2003, and NAACCR Registries, 1998-2002

| Cancer Site / Type | MALES | | | | FEMALES | | | |
|------------------------------------|----------------|--------|-----------|--------|-----------|--------|-----------|--------|
| | Incidence | | Mortality | | Incidence | | Mortality | |
| | MA | NAACCR | MA | NAACCR | MA | NAACCR | MA | NAACCR |
| All Sites | 623.1 | 561.4 | 256.0 | 247.5 | 460.6 | 418.2 | 172.8 | 165.5 |
| Brain & Other Nervous System | 8.7 | 7.9 | 5.6 | 5.6 | 6.5 | 5.6 | 3.5 | 3.7 |
| Breast | 1.5 | 1.4 | 0.2 | 0.3 | 141.3 | 131.0 | 26.7 | 26.4 |
| Breast <i>in situ</i> ² | — ³ | — | — | — | 49.0 | 28.5 | — | — |
| Bronchus & Lung | 89.1 | 90.1 | 71.8 | 76.3 | 62.0 | 54.6 | 44.5 | 40.9 |
| Cervix Uteri | — | — | — | — | 6.6 | 9.3 | 1.7 | 2.8 |
| Colon / Rectum | 72.2 | 65.9 | 26.8 | 24.8 | 50.9 | 47.9 | 17.9 | 17.4 |
| Corpus Uteri & Uterus, NOS | — | — | — | — | 28.7 | 24.5 | 4.4 | 4.1 |
| Esophagus | 11.6 | 8.6 | 10.2 | 7.7 | 2.5 | 2.1 | 1.9 | 1.8 |
| Hodgkin Lymphoma | 3.7 | 3.2 | 0.7 | 0.6 | 2.9 | 2.5 | 0.5 | 0.4 |
| Kidney & Renal Pelvis | 18.9 | 17.1 | 6.0 | 6.1 | 9.7 | 8.7 | 2.6 | 2.8 |
| Larynx | 8.0 | 7.7 | 2.8 | 2.5 | 1.8 | 1.7 | 0.6 | 0.5 |
| Leukemia | 14.8 | 15.6 | 9.7 | 10.2 | 9.6 | 9.4 | 5.7 | 5.8 |
| Liver & Intrahepatic Bile Ducts | 8.8 | 6.8 | 7.4 | 5.7 | 2.6 | 2.3 | 2.5 | 2.1 |
| Melanoma of Skin | 24.7 | 19.9 | 4.4 | 3.9 | 16.8 | 12.8 | 2.0 | 1.8 |
| Multiple Myeloma | 6.9 | 6.6 | 4.6 | 4.7 | 4.1 | 4.4 | 3.1 | 3.2 |
| Non-Hodgkin Lymphoma | 24.0 | 22.6 | 9.9 | 10.2 | 17.0 | 16.0 | 6.8 | 6.6 |
| Oral Cavity & Pharynx | 17.2 | 15.9 | 4.3 | 4.2 | 6.9 | 6.2 | 1.7 | 1.6 |
| Ovary | — | — | — | — | 14.8 | 14.0 | 9.2 | 8.9 |
| Pancreas | 13.6 | 12.7 | 13.4 | 12.2 | 10.7 | 9.8 | 10.1 | 9.2 |
| Prostate | 185.1 | 163.8 | 30.7 | 30.3 | — | — | — | — |
| Stomach | 12.3 | 10.8 | 7.2 | 6.3 | 5.3 | 5.1 | 3.5 | 3.2 |
| Testis | 6.3 | 5.4 | 0.3 | 0.3 | — | — | — | — |
| Thyroid | 4.8 | 3.9 | 0.4 | 0.4 | 14.3 | 10.8 | 0.5 | 0.5 |
| Urinary Bladder | 48.0 | 38.9 | 9.1 | 7.6 | 12.6 | 10.0 | 2.8 | 2.3 |

¹ Rates are age-adjusted to the 2000 U.S. Standard Population

² Breast *in situ* is excluded from all sites, from breast cancer type and is not presented for males

³ Dashed out cancers found in only one sex.

SPECIAL SECTION:
PROSTATE CANCER

PROSTATE CANCER

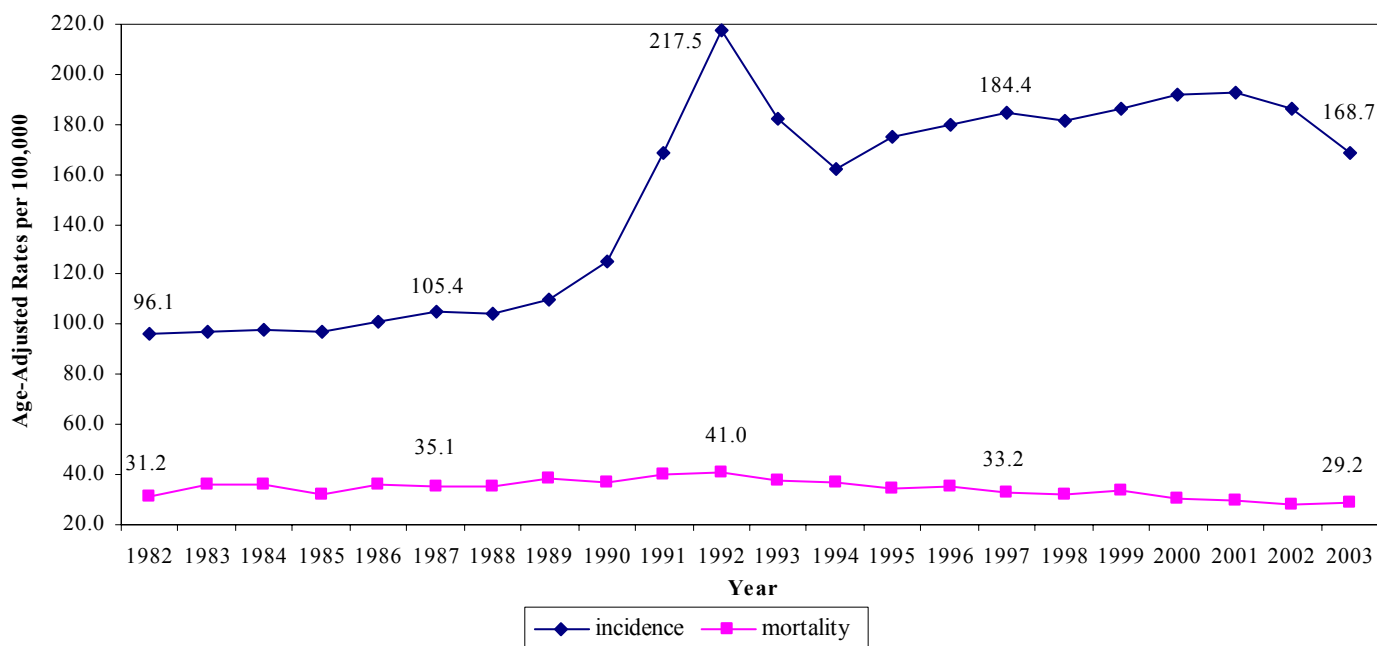
Introduction

Prostate cancer is the leading type of cancer diagnosed in males and the second leading cause of cancer deaths among males in Massachusetts. For the period 1999-2003, the average annual age-adjusted incidence rate of prostate cancer was 185 cases per 100,000 males. The age-adjusted mortality rate of prostate cancer was 6 times lower than the incidence rate (31 deaths per 100,000 males) (Tables 14, 21). During 1995-2001, 99.8% of U.S. males survived five years after a diagnosis of prostate cancer (15).

Since the use of early detection tests for prostate cancer became relatively common (about 1990), the prostate cancer death rate has dropped (16). Screening for prostate cancer is an individualized decision that needs to be discussed with a doctor. The decision needs to be based on the individual's risk, health, and age (16). The Massachusetts Men's Health Initiative recommends that the following groups consider having annual screenings: men over 50 years of age, men of African descent over 40 years of age, and men over 40 years of age with a family history of prostate cancer (17).

Long Term Incidence and Mortality Trends

Figure 7.
AGE-ADJUSTED¹ PROSTATE CANCER INCIDENCE AND MORTALITY RATES²
Massachusetts, 1982-2003



¹age-adjusted to the 2000 U.S. Standard Population ²per 100,000

Age-adjusted incidence and mortality rates for Massachusetts males for the years 1982 to 2003 are presented in Figure 7. Prostate cancer incidence and mortality trends peaked in 1992, with rates of 217.5 per 100,000 males and 41.0 per 100,000 males, respectively.

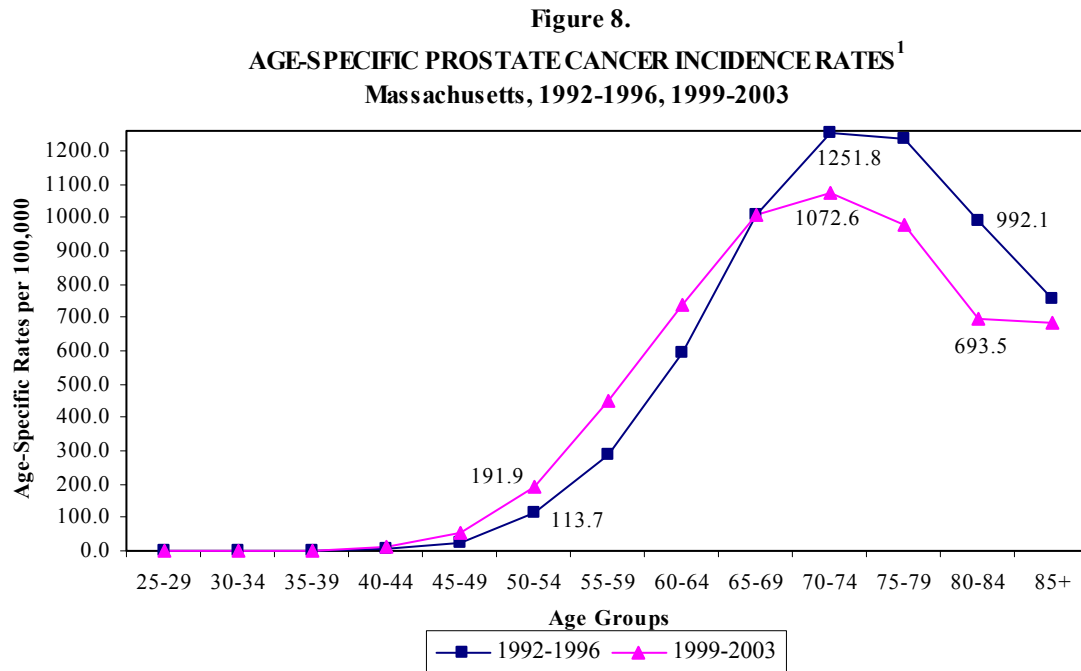
The long-term incidence and mortality trends for prostate cancer were analyzed using a Joinpoint regression model as described in the METHODS section of this report. The results of the analysis are as follows:

- The incidence rates had several changes in the annual percentages for the period of 1982-2003. The incidence rates showed an annual 1.6% incline until 1989, when it adjusted sharply to an annual 24.1% increase until 1992. After 1992, the incidence rates shifted to an annual 6.0% decline until 1995, then

adjusted to an annual 2.6% incline until 2001. After 2001, the incidence rates adjusted to an annual 7.0% decrease until 2003.

- The mortality rate increased an annual 1.5% until 1991, and then adjusted to an annual 3.0% decrease until 2003.

Age-specific Incidence Rates by Five Year Intervals



¹per 100,000

The values for the 1999-2003 age-specific rates are presented in Table 1.

The values for the 1992-1996 age-specific rates are presented in Appendix P-I.

The age-specific incidence rates for all Massachusetts males were low under the age of 44, and then made a dramatic rise starting at the age of 45. The rates for 1992-1996 rose to a peak of 1252 per 100,000 in the age group 70-74, while the rates for 1999-2003 peaked at 1073 per 100,000 in the same age group. The rates for 1992-1996 dropped after the age of 75, while the rates for 1999-2003 dropped after the age of 75 then plateau at the age of 80.

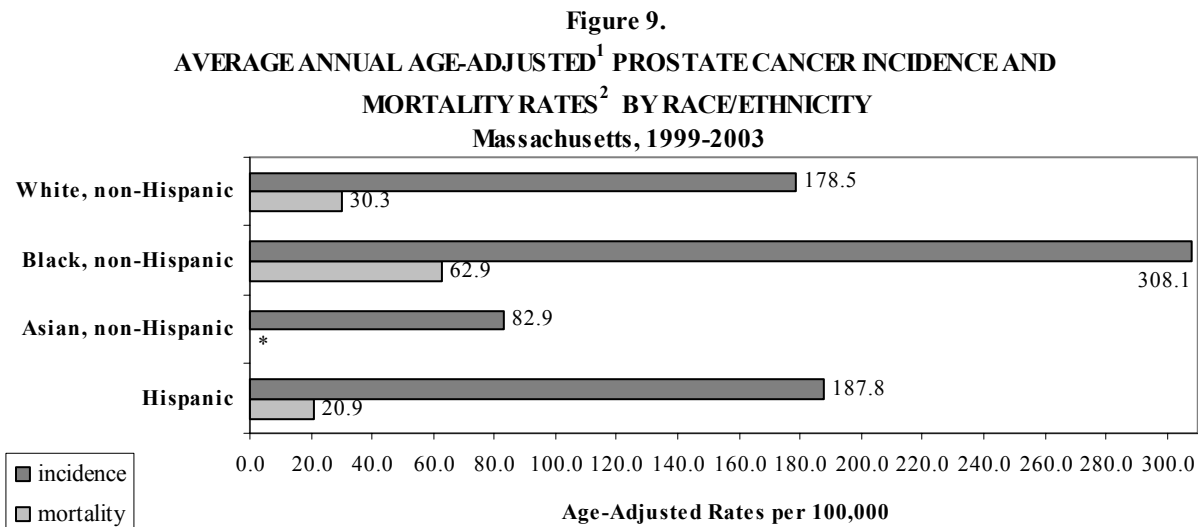
Little research on prostate cancer was conducted until the 1980s, when the number of scientific studies on prostate cancer started to increase (18). The prostate specific antigen (PSA) test was approved by the Food and Drug Administration to monitor prostate cancer in 1986. In a 1987 study, the PSA test was shown not to be specific since there are other physiological factors that can increase the PSA level in the blood (19). Two separate landmark studies in 1990 and 1991 showed that combining the PSA tests with digital rectal exams (DRE) provided the most effective way to detect prostate cancer. Over the years, studies done on prostate cancer have refined the screening recommendations (19).

In Massachusetts and nationally, 1992 was the pinnacle year for prostate cancer incidence and mortality rates. The PSA test was starting to be viewed as valuable even though it was not a precise. “Leading edge” baby boomers (born between 1946 and 1957) were beginning to reach their mid-40s, and screening was recommended in increasing numbers (20). The age-specific incidence rates support how prostate cancer screening has shifted diagnosis to earlier ages with 1999-2003 data having higher incidence rates than the 1992-1996 data starting at the 45-49 age groups through to the 65-69 age groups. The shift in diagnosis has decreased the incidence of distant stage disease causing a decline in the distant prostate cancer mortality trend (21). A decline in the overall prostate cancer mortality trend can be seen in Figure 7 starting at 1992, while the incidence trend dropped then fluctuated within the same time period.

The procedures to diagnosis prostate cancer and the process used for mandatory reporting have modified throughout the 90's. The PSA test has been used as a way to screen for prostate cancer, check disease progression, and monitor disease recurrence after treatment (16). Screening with PSA testing and DRE has shifted the diagnosing of prostate cancer into earlier stages (localized & regional stages) (Lynn Ries, MS, Surveillance, Epidemiology and End Results Program, National Cancer Institute, written communication, October 5, 2005). The long term incidence trend does not reflect an *in situ* stage in the analysis.

The prostate gland can enlarge naturally as a man ages, a condition called benign prostatic hyperplasia (BPH) (16). BPH is diagnosed by ruling out other causes using symptoms and diagnostic testing. There is also a condition called prostatic intraepithelial neoplasia (PIN) where the prostate gland cells develop abnormally and can turn into cancer. The prostate gland cells are graded based on their appearance under a microscope to determine whether cancer is present (22). This condition is not reported to the Registry, but almost 50% of men have this condition by the time they are 50 (22). This has created a segment of the male population that is monitored by their physicians to determine if the PIN grades have changed. The variability in the long term incidence trend may be attributed to the unknown percentage of men whose diagnosis has changed from PIN to prostate cancer over time, and who are treated in their physician's office.

Incidence and Mortality Rates by Race/Ethnicity



¹age-adjusted to 2000 U.S. Standard Population ²per 100,000

*Rates based on less than 20 cases are not calculated

Figure 9 presents the average annual age-adjusted prostate cancer incidence and mortality rates by race/ethnicity.

- Black, non-Hispanic males had the highest prostate cancer incidence rates.
- Black, non-Hispanic males had an incidence rate 3.7 times higher than Asian, non-Hispanic males and 1.7 times higher than White, non-Hispanic males.
- Mortality rates by race/ethnicity showed similar patterns to the incidence rates.

Black, non-Hispanics have historically been found to have higher incidence and mortality rates for prostate cancer. Studies done on this phenomenon have identified possible contributing factors. There seems to be an association between social and biological factors that affects the rates. Black, non-Hispanic men are often diagnosed with prostate cancer at an earlier age and with a higher grade disease. There had been some suggestion that biological differences contributed to the racial/ethnic disparities found in diagnosis (23). The comorbidity of other diseases (especially diabetes mellitus) with prostate cancer seems to increase the chance of shorter survival rates in black, non-Hispanics than other race/ethnicities (24). There are treatment decisions

that are possibly being confounded by the patient-level (socioeconomic status, preferences toward treatment outcomes, and trust in the healthcare system) and provider-level variables (clinician biases toward specific treatment recommendations and the lack of clinician agreement on what information is essential in making a treatment decision) making it difficult for equality in treatment outcomes (25). Although there is a higher mortality rate for black, non-Hispanic men, the trend of earlier detection of prostate cancer with the PSA test has decreased the mortality rate over time (26).

Prostate Cancer by Stage

Prostate cancer is staged according to the morphology determined by diagnostic tests. The primary tests and scores for diagnosing prostate cancer (DRE, PSA level, and Gleason score) are used to determine earlier stages. Imaging tests and lymph node biopsies are done to verify later stage diagnosis (27). Prostate cancer is staged using three stage classifications. Prostate cancer diagnosis does not incorporate an *in situ* stage (1.). Localized and regional stages (2. and 3.) are combined into one stage. The stage definitions provide the general classifications for the five stages of cancer diagnosis (28).

Stage Definition

These are five definitions of stages when determining treatment options and prognosis (29).

1. ***In Situ***

The earliest stage of cancer, before the cancer has spread, when it is limited to a small number of cells and has not invaded the organ itself.

2. ***Localized (early stage for mapping)***

The cancer is found only in the body part (organ) where it began; it hasn't spread to any other parts.

3. ***Regional (early stage for mapping)***

The cancer has spread beyond the original point where it started to the nearest surrounding part of the body (other tissues).

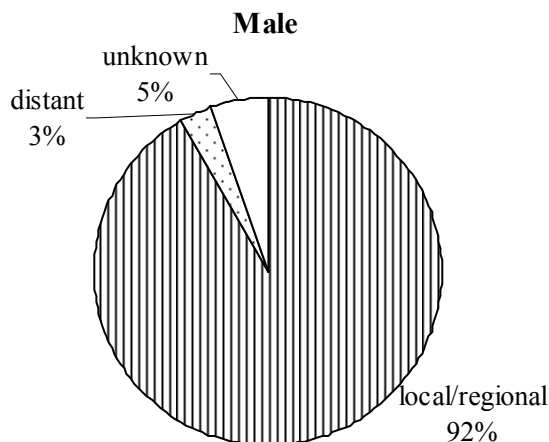
4. ***Distant (late stage for mapping)***

The cancer has spread to parts of the body far away from the original point where it began. This is the most difficult stage to treat, since the cancer has spread throughout the body.

5. ***Unstaged (unknown)***

There is not enough information about the cancer to assign a stage.

Figure 10.
DISTRIBUTION OF INVASIVE PROSTATE CANCER INCIDENT CASES BY STAGE
Massachusetts, 1999-2003

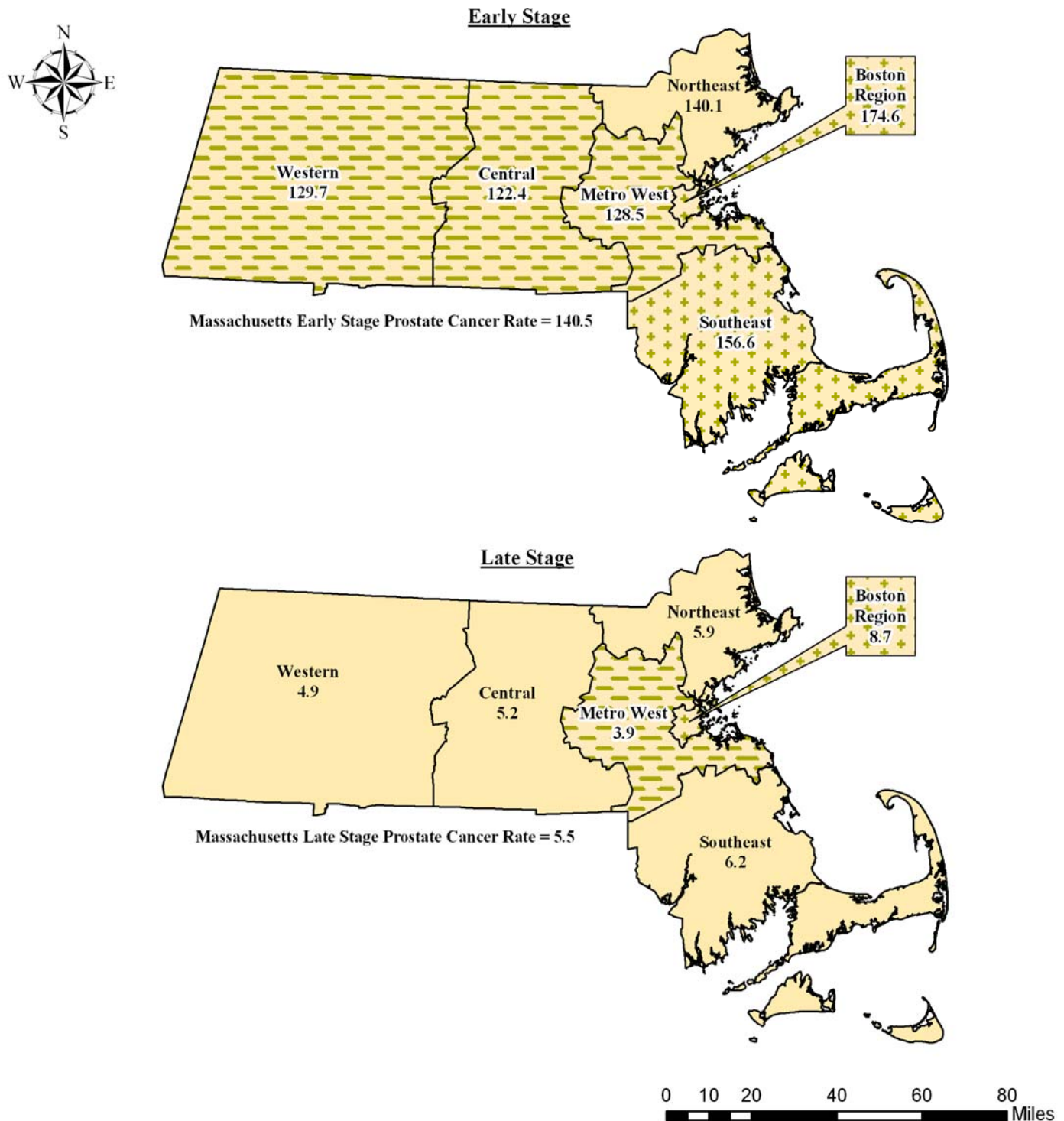


Prostate cancer was detected at a local/regional stage in 92% of males, while only 3% and 5% were diagnosed at the distant stage and unknown, respectively. Combining the localized and regional stages together for clinical evaluation was done between 1994 and 1995 (Lynn Ries, MS, Surveillance, Epidemiology and End Results Program, National Cancer Institute, written communication, October 5, 2005). The PSA test is the main reason for the extreme variability in prostate cancer statistics over time. The PSA test has contributed to the increase in the incidence of prostate cancer and the trend towards the detection of the disease at earlier stages (22). The earlier diagnosis of prostate cancer by the PSA test has resulted in improved prognosis and a decrease in mortality rates (26).

Prostate Cancer by Region vs. State

The prostate cancer incidence rates that were calculated for this portion of the report were separated into geographic sections of the state using the following six regions defined by the Massachusetts Executive Office of Health and Human Services (EOHHS): Western, Central, Northeast, Metro West, Southeast, and Boston (Figure 11). Each region was stratified into an early stage and late stage category of cancer. The early stage category of prostate cancer combines localized and regional stages. The late stage category of prostate cancer only contains distant stage. The prostate cancer incidence rates for each category by regions were compared to the Massachusetts incidence rates for each category.

Figure 11
Prostate Cancer Incidence Rates¹ by Stage at Diagnosis
Massachusetts by EOHHS Region
1999-2003



Map Key

- Regional rate is statistically significantly higher than the state rate.
- Regional rate is statistically significantly lower than the state rate.
- Regional rate is not significantly different from state rate.

¹ Per 100,000, Age-Adjusted to the 2000 U.S. Standard Population

Source: Massachusetts Department of Public Health, Center for Health Information, Statistics, Research and Evaluation, Massachusetts Cancer Registry

Cartographic Data Source: Massachusetts Executive Office of Environmental Affairs, MassGIS



The statistical significance was based on the 95% confidence intervals in this report. The confidence intervals were used to determine whether the regional age-adjusted incidence rates for each cancer were statistically significantly different from the state rates (29). The two rates were different with 95% probability if the confidence intervals that surrounded the regional and state rates *did not* overlap. The two rates were not statistically different if the confidence intervals that surrounded the regional and state rates *did* overlap. The age-adjusted incidence rates and 95% confidence intervals for Figure 11 are presented in Appendix P-II.

Prostate cancer rates were found to be statistically significant within the following regions for the early stage:

- Western, Central, and Metro West had lower rates when compared to the state rate.
- Southeast and Boston region had higher rates when compared to the state rate.

Prostate cancer rates were found to be statistically significant within the following regions for the late stage:

- Metro West had a lower rate when compared to the state rate.
- Boston region had a higher rate when compared to the state rate.

The results presented in Figure 11 needs to be cautiously interpreted when looking at how prostate cancer is distributed among the regions of Massachusetts. The statistically significant incidence rates within either stage category provide only general information about cancer distribution within Massachusetts. Comparisons between incidence rates for each stage in this report should not be used to determine any changes with prostate cancer programs within the regions.

There is the potential for confounding to influence the results. Variables such as race/ethnicity, population, migration, health behaviors, medical care, and aging may affect a region's rates by influencing the distribution of incidence cases among the regions (20, 30, 31, Wendy Cozen, DO, MPH, Epidemiologist, USC Cancer Surveillance Program, University of Southern California, written communication, May 20, 2005). Record completeness can contribute to confounding by producing information bias where the incident cases are not placed into the correct categories for analysis (32). For these reasons, the rates presented in these maps must be interpreted with caution.

Probability of Developing or Dying from Prostate Cancer

The probability of being diagnosed with or dying from prostate cancer (Table 25 and 26) was calculated using the SEER developed software, as described in the main introduction of this report. The results are presented as a table showing the probability (in percentage) of a person at a specific five-year age group being diagnosed with or dying from prostate cancer for every five years past their present age or remaining lifetime. The lifetime was restricted to the age 85 in this analysis.

Here are steps on finding the probability of developing prostate cancer or the probability of dying from prostate cancer for a man of a certain age:

- Find the individual's age in the 'current age' column.
- Look across the row for the number that corresponds to the age of interest for the probability of developing prostate cancer or probability of dying from prostate cancer.
- The number is the probability of developing cancer or dying from cancer for an alive and cancer-free individual at the age of interest when you are at the current age.

Example: For a 50-year old man, the probability of developing prostate cancer by age 70 is 10.1%.

Table 25.
PROBABILITY OF DEVELOPING PROSTATE CANCER BY A SPECIFIC AGE FOR MALES
Massachusetts, 1999-2003

| Percentage Estimate of Developing Prostate Cancer by a Certain Age | | | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| current age | 45 M | 50 M | 55 M | 60 M | 65 M | 70 M | 75 M | 80 M | 85 M |
| 0-85 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.2 | 9.8 | 13.1 | 15.5 | 16.8 |
| 5 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.3 | 9.9 | 13.2 | 15.6 | 16.8 |
| 10 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.3 | 9.9 | 13.2 | 15.6 | 16.9 |
| 15 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.3 | 9.9 | 13.2 | 15.6 | 16.9 |
| 20 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.3 | 9.9 | 13.3 | 15.7 | 16.9 |
| 25 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.3 | 10.0 | 13.3 | 15.7 | 17.0 |
| 30 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.3 | 10.0 | 13.4 | 15.8 | 17.1 |
| 35 yrs | 0.1 | 0.4 | 1.3 | 3.3 | 6.4 | 10.1 | 13.5 | 15.9 | 17.2 |
| 40 yrs | 0.1 | 0.4 | 1.3 | 3.4 | 6.4 | 10.2 | 13.6 | 16.0 | 17.3 |
| 45 yrs | | 0.3 | 1.3 | 3.3 | 6.5 | 10.2 | 13.7 | 16.2 | 17.5 |
| 50 yrs | | | 1.0 | 3.1 | 6.3 | 10.1 | 13.7 | 16.3 | 17.6 |
| 55 yrs | | | | 2.2 | 5.5 | 9.5 | 13.2 | 15.9 | 17.3 |
| 60 yrs | | | | | 3.5 | 7.8 | 11.8 | 14.6 | 16.1 |
| 65 yrs | | | | | | 4.8 | 9.2 | 12.3 | 14.0 |
| 70 yrs | | | | | | | 5.1 | 8.9 | 10.8 |
| 75 yrs | | | | | | | | 4.7 | 7.1 |
| 80 yrs | | | | | | | | | 3.4 |

Based on the 1999-2003 incidence data for prostate cancer, there was a less than 0.1% chance of developing prostate cancer before the age of 45. Therefore, those age segments were not included in this table.

The overall probability of developing prostate cancer over the lifespan (0-85 years) was 16.8% for males.

Table 26.
PROBABILITY OF DYING OF PROSTATE CANCER BY A SPECIFIC AGE FOR MALES
Massachusetts, 1999-2003

Percentage Estimate of Dying from Prostate Cancer by a Certain Age

| current age | 60 | 65 | 70 | 75 | 80 | 85 |
|-----------------|-----|-----|-----|-----|-----|-----|
| | M | M | M | M | M | M |
| 0-85 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 5 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 10 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 15 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 20 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 25 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 30 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 35 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.0 |
| 40 yrs | 0.1 | 0.2 | 0.4 | 0.7 | 1.3 | 2.1 |
| 45 yrs | 0.1 | 0.2 | 0.4 | 0.8 | 1.3 | 2.1 |
| 50 yrs | 0.1 | 0.2 | 0.4 | 0.8 | 1.4 | 2.1 |
| 55 yrs | 0.1 | 0.2 | 0.4 | 0.8 | 1.4 | 2.2 |
| 60 yrs | | 0.1 | 0.4 | 0.8 | 1.4 | 2.2 |
| 65 yrs | | | 0.3 | 0.7 | 1.4 | 2.3 |
| 70 yrs | | | | 0.5 | 1.2 | 2.2 |
| 75 yrs | | | | | 0.9 | 2.1 |
| 80 yrs | | | | | | 1.6 |

Based on the 1999-2003 mortality data for prostate cancer, there was less than 0.1% chance of dying from prostate cancer before the age of 60. Therefore, those age segments were not included in this table.

The overall probability of dying from prostate cancer over the lifespan (0-85 years) was 2.0% for males.

See beginning of the section entitled ‘Probability of Developing or Dying from Prostate Cancer’ for further discussion of these charts and how to interpret them.

SUMMARY

- The incidence and mortality age-adjusted rates for prostate cancer peaked in 1992.
- The age-specific prostate cancer incidence rates for 1992-1996 showed lower rates until the 70-74 age groups when compared to the rates for 1999-2003.
- Black, non-Hispanic males had the highest incidence and mortality rates of prostate cancer among race/ethnicity groups.
- Prostate cancer was detected at the localized/regional stage in 92% of males.
- The probability of developing prostate cancer over the lifespan 0-85 years was 16.8% for males overall.
- The probability of dying from prostate cancer over the lifespan 0-85 years was 2.0% for males overall.

APPENDIX P-I

Age-specific Incidence Rates¹ for Prostate Cancer

Massachusetts, 1992-1996

| Age Groups | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 |
|------------|-------|----------------|-------|-------|--------|--------|--------|-------|-------|
| Prostate | 0.2 | — ² | — | 0.1 | 0.1 | 0.1 | 0.1 | 0.8 | 3.5 |
| Age Groups | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85+ |
| Prostate | 22.5 | 113.7 | 290.6 | 591.7 | 1007.3 | 1251.8 | 1233.7 | 992.1 | 753.5 |

Population Estimates by Age

Massachusetts, 1992-1996

| Age Groups | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 |
|------------|-----------|-----------|---------|---------|-----------|-----------|-----------|-----------|-----------|
| | 1,075,290 | 1,022,002 | 946,684 | 986,323 | 1,229,782 | 1,290,686 | 1,328,501 | 1,272,355 | 1,128,125 |
| Age Groups | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85+ |
| | 989,229 | 737,310 | 579,903 | 542,141 | 523,869 | 439,281 | 310,458 | 184,055 | 134,565 |

¹per 100,000

²Dashed out age groups had no incident cases.

APPENDIX P-II

Age-adjusted¹ Incidence Rates², Number of Cases, 95% Confidence Intervals (95% CI), and Significance³ for Prostate Cancer by Region and Stage

Massachusetts, 1999-2003

| Prostate | | | | |
|---------------|-------|-------|-------------|--------------|
| early stage | | | | |
| Region's name | Cases | Rates | 95% CL | Significance |
| Western | 2999 | 129.7 | 125.0–134.4 | – |
| Central | 2518 | 122.4 | 117.6–127.2 | – |
| Northeast | 4703 | 140.1 | 136.1–144.1 | |
| Metro West | 5297 | 128.5 | 125.0–131.9 | – |
| Southeast | 5685 | 156.6 | 152.5–160.7 | + |
| Boston | 2773 | 174.6 | 168.1–181.1 | + |
| Statewide | 23975 | 140.5 | 138.7–142.3 | reference |

| Prostate | | | | |
|---------------|-------|-------|----------|--------------|
| late stage | | | | |
| Region's name | Cases | Rates | 95% CL | Significance |
| Western | 105 | 4.9 | 3.9–5.8 | |
| Central | 100 | 5.2 | 4.1–6.2 | |
| Northeast | 178 | 5.9 | 5.0–6.8 | |
| Metro West | 146 | 3.9 | 3.3–4.6 | – |
| Southeast | 209 | 6.2 | 5.3–7.0 | |
| Boston | 130 | 8.7 | 7.2–10.2 | + |
| Statewide | 868 | 5.5 | 5.2–5.9 | reference |

¹age-adjusted to the 2000 U.S. Standard Population

²per 100,000

³The patterns of minuses (–) and pluses (+) indicate regional statistical significance that is based on whether there is overlap in the 95% confidence interval ranges for the state and region. (–) indicates the region's rate is significantly lower than the state's rate. (+) indicates the region's rate is significantly higher than the state's rate.

APPENDICES

APPENDIX I

ICD CODES USED FOR THIS REPORT

| Cancer Site / Type | <i>C o d e s</i> | |
|--|---|------------------|
| | ICD-O-3* | ICD-10** |
| Brain & Other Nervous System | C70.0 - C72.9 except 9590 - 9989 | C70 - C72 |
| Breast (includes <i>in situ</i>) | C50.0 - C50.9 except 9590 - 9989 | C50 |
| Bronchus & Lung | C34.0 - C34.9 except 9590 - 9989 | C34 |
| Cervix Uteri | C53.0 - C53.9 except 9590 - 9989 | C53 |
| Colon/Rectum | C18.0 - C18.9, C19.9, C20.9, C26.0 except 9590 - 9989 | C18 - C20, C26.0 |
| Corpus Uteri & Uterus, NOS | C54.0 - C54.9, C55.9 except 9590 - 9989 | C54 - C55 |
| Esophagus | C15.0 - C15.9 except 9590 - 9989 | C15 |
| Hodgkin Lymphoma | C00.0 - C80.9 (includes 9650 - 9667) | C81 |
| Kidney & Renal Pelvis | C64.9, C65.9 except 9590 - 9989 | C64 - C65 |
| Larynx | C32.0 - C32.9 except 9590 - 9989 | C32 |
| Leukemia | C00.0 - C80.9 (includes 9733, 9742, 9800 - 9820, 9826, 9831 - 9948, 9963- 9964) C42.0, C42.1, C42.4 (includes 9823, 9827) | C90.1, C91 - C95 |
| Liver and Intra- Hepatic Bile Ducts | C22.0, C22.1 except 9590 - 9989 | C22 |

| Cancer Site / Type | C o d e s | |
|--|---|------------------|
| | ICD-O-3* | ICD-10** |
| Melanoma of Skin | C44.0 - C44.9 (includes 8720 - 8790) | C43 |
| Multiple Myeloma | C00.0 - C80.9 (includes 9731, 9732, 9734) | C90.0, C90.2 |
| Non-Hodgkin Lymphoma | C00.0 - C80.9 (includes 9590 - 9596, 9670 - 9729) All sites except C42.0, C42.1, C42.4 (includes 9823, 9827) | C82 - C85, C96.3 |
| Oral Cavity & Pharynx | C00.0 - C14.8 except 9590 - 9989 | C00 - C14 |
| Ovary | C56.9 except 9590 - 9989 | C56 |
| Pancreas | C25.0 - C25.9 except 9590 - 9989 | C25 |
| Prostate | C61.9 except 9590 - 9989 | C61 |
| Stomach | C16.0 - C16.9 except 9590 - 9989 | C16 |
| Testis | C62.0 - C62.9 except 9590 - 9989 | C62 |
| Thyroid | C73.9 except 9590 - 9989 | C73 |
| Urinary Bladder (includes <i>in situ</i>) | C67.0 - C67.9 except 9590 - 9989 | C67 |

* *International Classification of Diseases for Oncology, 3d Ed. (2)* (includes codes added since publication) for incidence data

** *International Classification of Diseases, Tenth Revision (5)* (includes codes added since publication) for mortality data

Appendix II

POPULATION ESTIMATES BY AGE, RACE/ETHNICITY AND SEX

Massachusetts, 1999-2003

| Age Group | White, non-Hispanic | | | Black, non-Hispanic | | | Asian, non-Hispanic | | | Hispanic | | |
|--------------|---------------------|-----------|-----------|---------------------|---------|---------|---------------------|---------|---------|----------|---------|---------|
| | Males | Females | Total | Males | Females | Total | Males | Females | Total | Males | Females | Total |
| 0-4 | 787,938 | 749,493 | 1,537,431 | 67,836 | 64,925 | 132,761 | 44,725 | 45,275 | 90,000 | 114,140 | 110,093 | 224,233 |
| 5-9 | 858,723 | 812,969 | 1,671,692 | 78,111 | 74,699 | 152,810 | 43,299 | 42,140 | 85,439 | 119,118 | 113,062 | 232,180 |
| 10-14 | 872,502 | 825,864 | 1,698,366 | 74,611 | 72,281 | 146,892 | 40,950 | 39,140 | 80,090 | 105,576 | 101,562 | 207,138 |
| 15-19 | 832,056 | 811,605 | 1,643,661 | 69,489 | 66,593 | 136,082 | 47,872 | 50,813 | 98,685 | 101,176 | 96,512 | 197,688 |
| 20-24 | 779,937 | 803,407 | 1,583,344 | 64,814 | 68,144 | 132,958 | 58,008 | 65,266 | 123,274 | 105,204 | 103,394 | 208,598 |
| 25-29 | 850,404 | 876,421 | 1,726,825 | 63,384 | 68,617 | 132,001 | 70,495 | 71,516 | 142,011 | 99,800 | 100,067 | 199,867 |
| 30-34 | 987,914 | 1,016,559 | 2,004,473 | 67,465 | 72,524 | 139,989 | 62,747 | 62,297 | 125,044 | 96,280 | 99,345 | 195,625 |
| 35-39 | 1,117,374 | 1,146,250 | 2,263,624 | 69,751 | 74,513 | 144,264 | 54,604 | 52,676 | 107,280 | 85,053 | 89,337 | 174,390 |
| 40-44 | 1,100,249 | 1,143,483 | 2,243,732 | 62,760 | 66,186 | 128,946 | 43,205 | 44,447 | 87,652 | 64,720 | 69,382 | 134,102 |
| 45-49 | 988,004 | 1,034,087 | 2,022,091 | 48,886 | 53,717 | 102,603 | 34,661 | 37,263 | 71,924 | 47,052 | 52,333 | 99,385 |
| 50-54 | 885,696 | 936,802 | 1,822,498 | 38,990 | 44,147 | 83,137 | 26,298 | 28,012 | 54,310 | 35,264 | 41,171 | 76,435 |
| 55-59 | 665,714 | 715,384 | 1,381,098 | 27,684 | 34,032 | 61,716 | 18,420 | 18,894 | 37,314 | 23,292 | 27,424 | 50,716 |
| 60-64 | 502,218 | 557,807 | 1,060,025 | 20,503 | 26,161 | 46,664 | 14,429 | 14,908 | 29,337 | 16,163 | 20,547 | 36,710 |
| 65-69 | 457,760 | 541,402 | 999,162 | 15,718 | 21,381 | 37,099 | 11,152 | 12,416 | 23,568 | 10,962 | 14,908 | 25,870 |
| 70-74 | 429,858 | 562,521 | 992,379 | 12,468 | 18,035 | 30,503 | 7,782 | 9,716 | 17,498 | 7,616 | 11,054 | 18,670 |
| 75-79 | 348,357 | 525,673 | 874,030 | 8,472 | 14,223 | 22,695 | 5,206 | 6,705 | 11,911 | 4,888 | 7,444 | 12,332 |
| 80-84 | 220,144 | 400,504 | 620,648 | 4,725 | 9,419 | 14,144 | 2,485 | 3,798 | 6,283 | 2,739 | 4,846 | 7,585 |
| 85+ | 147,536 | 414,385 | 561,921 | 3,390 | 8,322 | 11,712 | 1,798 | 3,228 | 5,026 | 2,368 | 4,354 | 6,722 |

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